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Following a general consideration of the functional aspects of planning facilities and the relationship between program and facilities, a detailed presentation is made of planning buildings for college and university indoor physical education activities. Recommendations are made with regard to design, structural and functional features of auxiliary gyms, special activity areas, social and recreation facilities, and service facilities. In considering facilities common to all indoor areas (surfaces, lighting, acoustics, etc.), arguments pro and con are presented pertaining to commonly used materials and their application. Also included is a consideration of usual errors in planning and construction. (FS)

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A GUIDE FOR PLANNING
Indoor Facilities for College Physical Education

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EDITOR'S INTRODUCTION

This is one of a series of volumes dealing with selected aspects of educational plant planning that are published under the sponsorship of the Institute of Field Studies, Teachers College, Columbia University. The several volumes are reports of individual research projects undertaken by graduate students at Teachers College as part of their programs of studies leading to the Doctor of Education Degree. The respective authors are men who have had experience in the areas of which they write, and their broad visitation and intensive studies of these areas should give readers new ideas and suggestions for improved planning of specialized educational plants.

This volume, prepared by Dr. Wayne H. Crawford under the direction of Dr. Harry A. Scott, Professor Emeritus of Health and Physical Education at Teachers College, Columbia University, deals primarily with the planning of gymnasiums for colleges and universities. Dr. Crawford, who currently is Associate Professor of Physical Education at the University of California, had the opportunity to travel widely in the United States, inspecting gymnasiums in colleges and universities that had significant programs in physical education, and talking with directors and instructors in those institutions about their mutual problems. Not only was he particularly interested in learning "what to do," but also "what not to do" in planning new gymnasium structures. This project merits serious study by college authorities and architects who are faced with the problem of planning a structure of this type for indoor physical education activities.

Henry H. Linn

AUTHOR'S PREFACE

As college and university enrollments mount, there is increasing demand for an expanded physical plant to care for the many activities and needs of the student body and faculty. Among the many plant structures and facilities comprising an institution of higher learning are those required for physical education, health and recreation. There seems little doubt that physical education and athletic programs will thrive in the future as never before. The tremendous growth of television, with its extensive coverage of all types of sports events, has been a powerful publicity medium for physical education and sports, and has stimulated our youth to develop skill in the activities offered by the physical education and athletic programs. Furthermore, both President Kennedy and former President Eisenhower have emphasized the importance of physical fitness as an end product of physical education, athletics, sports and common sense living. Higher standards of physical fitness among our population will depend in part on the adequacy of appropriate plant facilities in our educational insitutions.

The term adequate facilities implies an entirely different connotation today than in the earlier years of American physical education. At that time, very little planning was necessary in the construction of a new building. Gymnasiums of the traditional type were small halls equipped with varied apparatus, where auxiliary rooms, spectator accommodations, and ceiling height were considered of little importance. With the advent of basketball as a major spectator sport, it became necessary to raise the ceiling height and provide spectator space. The present philosophy of physical education, based upon the offering of experiences in a wide variety of sports and recreational activities, demands a structure housing not only a sufficient number of facilities but also those which are adequate in kind. Such a building, serving a greatly increased number of functions which involve the entire student body, the faculty, and the general public, presents perhaps more complex problems of design and construction than any other of the campus environment.

It seems apparent that, in the past, authorities have been too willing to copy the building of another institution, good points and errors alike. In many instances authorities appear to have rushed prematurely into a construction program, once the funds have been approved, without adequate study of local conditions, building construction, and sound educational philosophy. There is evidence that many buildings have been designed by individuals who have not kept abreast of modern trends in the program which should give direction to the planning of facilities, or who were more concerned with seating capacity than with a well rounded program of physical education.

The physical education personnel who are program specialists have been consistent in their complaints that the building which houses the activities of their department is "strictly an architects design." Many have indicated that their assistance was not requested at the time plans and specifications were prepared. These program specialists do not want to assume the prerogative of the architects and engineers who are expected to have responsibility for construction design, but they ought to assume a major role in the planning of the facilities which are to serve the physical education program. This role requires that the specialist, as an expert in his field, interprete the program in terms of the facilities needed in a specific situation for both the present and the future.

It is realized that the provision of **all the** facilities recommended in this book would represent an ideal situation, one possible only in a financially favored institution. It is believed, however, that authorities in all institutions of higher learning should strive for the ideal, and compromise only when and where necessary.

In the writing of a book of this type it has been imperative that visits be made to as many college and university physical education buildings as possible, particularly those constructed recently. It would be virtually impossible to express my gratitude to the many physical education directors, instructors, coaches, equipment room personnel and building custodians who have so graciously given their time to show and discuss facilities at their institutions. Not once in the countless visits made to colleges and universities throughout the country have I received anything but the finest possible courtesy and cooperation.

I would like to express my sincere appreciation to the following physical education or publicity directors who have so kindly made available to me the photographs used, and have granted permission for the publication of these photographs: Oliver Cornwell and George Shepard, University of North Carolina; Ethel Martus, Woman's College, University of North Carolina; D. K. Stanley, University of Florida; John H. Shaw and Lucille Verhulst, Syracuse University; George Van Bibber and Geraldine Novotny, University of Connecticut; Al Derian, Long Beach, California, City College; Gilbert Bishop, Bakersfield,California, College; Roy Henning, Fred Medart Products Incorporated; and John Reick, Hillyard Chemical Company.

Special gratitude is expressed to Professor Emeritus Harry A. Scott of Teachers College, Columbia University; Jack E. Hewitt of the University of California, Riverside; and to my wife, Marjorie, for the guidance and encouragement which has made this book possible.

W. H. C.

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CHAPTER I

THE FUNCTIONAL ASPECT OF PLANNING FACILITIES FOR PHYSICAL EDUCATION

The Nature of Functional Planning

The term functional planning, when applied to physical facilities of an educational plant nature, might be defined as "those efforts on the part of all concerned to plan and design facilities according to their maximum utility in a desired situation".

This definition implies two significant considerations: (1) that planning, to be most effective, must be a combined enterprise including the interests of architects, engineers, consultants, and program specialists; and (2) that the facilities will fulfill the purpose for which they were intended only when they serve the maximum demands of a specific program and situation.

The planning of facilities from a functional standpoint places due emphasis on the importance of physical characteristics of construction. Such factors as the choice of building materials for floors, walls and ceilings, the most advanced methods of lighting, heating and ventilation, and the stresses and strains of materials are vital to a well conceived and functional physical plant. Functional planning goes far beyond these considerations, however. A building which is technically well constructed does not necessarily imply a building which serves to its greatest possible extent the student body or the program. Scores of expensive and beautiful gymnasiums over the country stand as a tribute to the professional skill of architects and engineers, yet house a definitely limited scope and range of activities.

Wise and efficient planning will eliminate the vast majority of administrative difficulties relating to facilities for physical education. A few examples may clarify this statement: (1) the installation of a tote-basket plan of gymnasium costume storage will, if properly designed and operated, conserve activity space, promote the realization of health objectives, and reduce thievery; (2) recessed and protected radiators in dressing rooms, shower rooms, and activity areas will prevent accidents; (3) intelligently located activity areas make for ease of supervision; and (4) the provision of folding bleachers which are recessed and flush with the walls will increase available floor area, eliminate a dangerous obstruction, enhance the attractiveness of the gymnasium, and may provide a smooth rebounding surface for tennis practice during inclement weather.

It cannot be emphasized too strongly that the time, cost, and effort involved in functional planning will pay big dividends in the reduction of construction and maintenance costs, the elimination of errors, and improved efficiency of the physical education program.

The Need for Functional Planning

In planning the physical education building, or any other building of the campus, the start should be made from the educational program. It is folly to believe that a building to house the local physical education program can be constructed according to a standard design used at another institution. A prevalent error of planning has been the practice of reproducing a recent construction at a neighboring college or university, - mistakes and good points alike. Imitation can be only a makeshift. It is unfortunate that many physical education buildings, even in prominent institutions, have been designed according to construction standards rather than educational principles.

There are few gymnasiums in the nation that will satisfy all of the needs of other institutions. There are few gymnasiums, in fact, that completely satisfy the needs of their own environment over a considerable period of time. The individual characteristics of one institution are never identical with those of another. Such factors as the size and nature of the student body, the locality of the college or university, the climate, the type and purpose of the institution, the popularity of certain sports, the constant change of program emphasis, and the philosophy of education are but a few of the characteristics which make the imitation of facilities wholly impractical.

There are three primary objectives in the design of a new building: First, maximum utility and flexibility to meet the requirements of the educational program; second, lowest cost that will assure safe and healthful conditions; and, third, beauty in keeping with the best traditions of the campus.

To assist the architect in attaining all three of these objectives, modern engineering has provided him with many new tools and new methods of construction. The development of mechanical devices, new materials, heat control, simple and effective means of ventilation, air-conditioning, sound-proofing, movable partitions, and glass walls, all contribute to the integration of the building design with the educational program. Exterior walls for purposes of supporting the building load are no longer necessary. They can be made almost entirely of glass, thereby admitting two and three times as much light as in the old buildings, if desired.

Sound-proof partitions between areas can be so designed as to facilitate multiple use of space provisions as desired, thus contributing to greater flexibility. To provide maximum floor area and eliminate safety hazards, heating units, plumbing fixtures, and bleachers can be recessed in the walls.

The final test of all facilities is the extent to which they make possible the greatest degree of participation in those activities of the physical education and recreation program. Functional planning is directed toward this end.

Principles Underlying Construction Standards

It is increasingly evident that the provision of adequate facilities depends upon the wise choice of construction standards, on the one hand, and the manner in which these standards are incorporated into the educational program on the other. The choice of standards involves consideration of appropriate size, number, and quality. The principles underlying these standards refer to location, accessibility, isolation, safety, utility, and other factors pertaining to the efficient functioning of facilities. The extent to which the physical education building fulfills its purpose is directly dependent upon the success with which the planning group is able to integrate approved standards and the principles underlying these standards.

A list of underlying principles, and the definition of each, is as follows:[1]

---

[1] The College Physical Education Association, College Facilities for Physical Education, Health Education, and Recreation, (K. W. Bookwalter, Editor), pp. 8-12.

Accessibility - All facilities should be readily available to the proper groups.

Attractiveness - Facilities should be attractive but not ornamental. They should inspire appreciative treatment and care on the part of those who use them.

Economy - The cost of facilities should be kept at a minimum compatible with effective instruction and with maximum, wholesome participation.

Flexibility - An increase or decrease in the kind and amount of activities offered for participants should be readily and economically possible.

Integration - Facility units should be functionally related.

Isolation - The facility unit should be so placed and constructed as to eliminate such disturbing factors as noise, odors, moisture, and interference from other activities.

Safety, Hygiene, and Sanitation - Due consideration should be given to the safety, hygiene, and sanitation of the plant in the provision, arrangement, and maintenance of the facilities.

Supervision - Facilities should be provided and arranged so that they may be economically and effectively supervised, controlled and managed.

Utility - The principle of utility is achieved when a minimum of units will provide effectively for the maximum amount of activity.

Validity - A facility is valid when it effectively serves the purpose for which it was primarily intended.

The Program Specialist as a Building Expert

The day has passed, if it ever existed, when an architect could be employed, advised as to the amount of available building funds, and then permitted to follow his professional initiative in the planning of the physical education building. Even the most competent architect does not possess the background in education and physical education that would enable him to provide the most functional facilities for a specific program or institution. Those who are to plan an efficient building unit must thoroughly understand the program it is to house.

The employment of competent architects and engineers constitutes an important aspect of the building program, but these specialists must be guided in order that the finished building may be an adequate service unit, and that it will reflect funds wisely spent.

That person in the physical education department who knows most about the program may be referred to as the program specialist. The importance of this individual as a member of the planning group cannot be overemphasized. It is largely through his knowledge of the program, and the extent to which he is able to interpret the program to architects and engineers, that the provision of adequate facilities is made possible.

In the majority of instances, this individual will be the director of the department. This need not necessarily be true, however. He may be an experienced member of the staff who, through his knowledge of the program and his interest in the problem of facilities, has been delegated the responsibility of working with those who will draw building plans and specifications. It would be extremely advantageous if this person had done considerable graduate study, with emphasis on the problems of physical education administration. A knowledge of these problems will go far toward the elimination of administrative difficulties that arise when facilities are not constructed in terms of functional relationships. The program specialist should be able to visualize the construction of facilities from the standpoint of educational philosophy and those principles underlying construction. The architect and engineer, by virtue of their background and training, think primarily in terms of building standards. Efficient physical education units are the outcome of the combined efforts of architects, engineers, consultants, and program specialists.

Organization for the Construction Program

A college or university plan is a living thing - a combination of two types of knowledge: (1) of educational methods and (2) of the means of physically housing an institution in which the educational methodology has been worked out.[1]

Educational planning for buildings which are to house a modern program of physical education is a complex undertaking and requires the cooperative efforts of many individuals and groups: administrators, staff members, architects, engineers, consultants, custodians, and students. Architects can hardly be expected to be well versed in their own fields and, at the same time, be proficient in the field of educational planning. They are not capable of translating educational practices into educational requirements for specific buildings, nor do they desire to do so. Educational planning for buildings is clearly a job of educators. Architects have every right to expect that the results of such planning be furnished them.[2]

General Pattern for Educational Planning

The following list of general planning considerations should be adhered to no matter what the size of the institution or its policies with regard to a construction program may be:[3]

> A thorough study of the college or university building needs should be made prior to the planning of specific facilities.
>
> Planning should utilize all persons who can contribute to the planning process.
>
> A consideration of current and future physical education programs should precede consideration of specific building features.

---

[1] Carl Feiss, "Planning Problems of Colleges and Universities," American School and University, 20th ed., New York, American School Publishing Corporation, 1948-49, p. 37.

[2] W. A. Whitehead and R. L. Featherstone, "School Building Survey Techniques," American School and University, 20th ed., New York, American School Publishing corporation, 1948-49, p. 102.

[3] Ibid., p. 102.

> The initial planning should be in terms of an ideal, without regard for costs.
>
> Architects should be furnished detailed information regarding educational specifications.
>
> If consultants are employed, their functions should be to advise and assist local personnel in determining educational and building needs and to assist architects in interpreting and applying educational specifications.
>
> The basic educational specifications for a building finally adopted should make the best possible use of the building within the limits of available funds.

Initial Planning

Many institutions maintain permanent planning or steering committees charged with responsibility for drawing up a master plan of the campus and its future expansion. This committee may be comprised of a small number of faculty members appointed by the president. Many institutions employ a professional architect, referred to as the university or college planner. The initial planning for the construction of every new building on the campus will originate with the planner and/or the steering committee.

The primary function of the steering committee will be that of allocating space for the proposed physical education building. They will determine the building site according to its accessibility to the student body and the general public; its location with respect to dormitories, classroom buildings, and library; and its location with respect to related facilities such as stadium, athletic fields, natatorium and field house.[1] The original location of the building has considerable bearing upon its utility.

As a general rule, the steering committee will cease its concern with the proposed construction after the building site has been determined. In some cases, however, the committee may be charged with the following responsibilities, in addition to that described above:[2]

Designating individuals to serve on special planning committees.

Designating the specific functions of various individuals and committees in the planning process.

Formulating a basic sequence for planning operations and tentative time limits.

Organization of Planning Committee

In addition to the general steering committee, the college or university president will usually appoint a specific planning committee whose responsibility will be to cooperate with architects, engineers and consultants from the first stages of the planning process until the completion of the building. In some instances, special committees will be formed to deal with particular phases of the building, such as food service facilities, the health service, and the corrective-exercise and adapted sports gymnasium. It is extremely desirable that all members of the physical education staff contribute to the preliminary planning of those areas in which they direct activities, since they usually are well aware of specific facility needs and functions.

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[1] Ibid.

[2] Ibid.

Selection of Committee Membership

No matter what method of selecting members of the planning committee is employed, certain basic requirements for membership should be considered. The responsibility for planning an educational building which is to serve the student body during the next fifty or more years should not be entrusted to individuals possessing little talent or interest in the task at hand.

The following criteria are proposed by Whitehead and Featherstone for the selection of members of the planning committee:[1]

> As many members of the physical education staff as possible should be utilized.
>
> Each member should possess certain knowledge that will contribute to the solution of the problem being attached.
>
> The individuals selected must have a deep interest in the task at hand, and should be willing to contribute generously in time and effort.
>
> Each member should have previously demonstrated ability to work cooperatively in a group to achieve results.

Line of Committee Authority

Although efficiency of committee action is largely dependent upon the careful selection of those persons who are to serve, it is also important that a clearly defined line of authority be established. Optimum results will not be achieved where confusion exists as to direct responsibility.

The chairman of the committee should be responsible only to the president of the institution. It is important that architects, inspectors, contractors, and foreman know exactly from what specific sources they are to receive instructions throughout the planning and construction program. Much needless confusion and irritation will be avoided if a direct line of authority is established and understood by all concerned.

A suggested plan of direct responsibility is as follows:

1. College or university president.
2. Chairman and planning committee.
3. State architect (if the construction is at a state institution).
4. Building architect (may be same as above).
5. State inspector.
6. Contractor.
7. Foreman.

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[1] Ibid.

All suggested changes or additions in building plans, once the actual construction of facilities is under way, should go directly to the committee chairman and then down the line to architects and inspectors. A great deal of delay, confusion and irritation has been reported at institutions where direct authority was not established and suggestions or criticisms went directly to the contractor or foreman from any number of sources.

Major Responsibility of Committee

Perhaps the most important responsibility of the planning committee is that of assembling and organizing information other than that to be gathered by various special committees. Such information includes:

Enrollment data - past, present, and future.

Data concerning programs - prescribed and elective courses, time allotments, current class schedules, activities other than courses which will utilize building facilities, and statements of anticipated changes in the organization of the physical education program and related activities.

Administrative policies - desired class size, teacher load, provisions for handicapped students, number of semesters students are required to enroll in physical education program, etc.

Provisions for handling spectators - desired seating accommodations, type of spectator accommodations required, and the flow of traffic within the building.

Desirable maximum capacities - the number who will use facilities at times of peak load.

General Functions of Planning Committee

The general functions of the planning committee may be stated as follows:

Evaluate the existing philosophy and program of education.

Recommend changes in and interpretation of the existing philosophy and program of physical education.

Prepare a statement of educational and building requirements for each aspect of the college or university program involved in the proposed building plans.

Assist in the preparation of educational specifications.

Assist in the evaluation of building plans and specifications.

Assist in the determination of essential design characteristics of specific building features.

Assist in the preparation of equipment layouts and specifications.

Assist in the evaluation of the completed building.

Functions of Special Committees

Since the physical education building is very often utilized for various institutional and special purposes other than those connected with the physical education and athletic program, there may be need for the formation of several special committees who will make a study of the facility needs of their respective areas. Such committees will undoubtedly be needed to assist in the planning of the health service, corrective-exercise and adapted sports gymnasium, food service facilities, laundry, and facilities for the opposite sex if these provisions are to be included in the construction. Each special committee should be comprised of those persons on the campus who are to direct and use the units under consideration. Special consultants may be invited from the state department or from other institutions to assist in the planning of these areas.

Each special committee may be held responsible for the following general functions:[1]

1. Making a comprehensive study of the specific functions of the area under construction.
2. Determining the specific nature and extent of the program in each area.
3. Submitting a list of the administrative and organizational policies that affect the program that has been prescribed in each area.
4. Submitting a list of the desirable facilities needed for implementing the program in the area.
5. Submitting a list of the undesirable building facilities noted in similar areas at other institutions.

Sequence of the Construction Program

A great deal of confusion and considerable waste of time will result where no definite sequence of action is prescribed for the planning of a construction program. Although a wise selection of architects, contractor, and committee personnel is of vital importance, it is perhaps of equal importance that a definite sequential pattern of planning procedures be outlined and followed, such as:

1. When it has been decided that new facilities for physical education are to be constructed, the university planner and/or steering committee will make a study of the needs in terms of space allocation, and will submit recommendations to the president or his delegated representatives.
2. The president appoints a chairman of the planning committee, and generally with his assistance, selects those individuals who will serve on the committee.
3. The responsibilities, authority, and functions of the planning committee are set forth; and special attention is devoted to the planning of sequential action.

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[1] Ibid., p. 104.

4. A competent architect is selected. If desired, a consulting architect is also employed.

5. All persons on the campus who can contribute to the planning of the building are called upon to work with the planning committee in formulating a list of the facility needs in terms of desired programs. Special committees are appointed for the study of those areas in which specific knowledge and information is desirable.

6. From an analysis of present and future program requirements, a comprehensive list of desired facilities is compiled.

7. The architect is informed of the type building desired, the amount of building funds available, and is given a complete picture of the educational specifications prepared by all committees.

8. The committees and architect visit a number of institutions of similar type and characteristics; selecting, where possible, those institutions which have recently constructed new physical education facilities.

9. All committees and the architect pool the information obtained; and, from this information, the architect prepares a number of preliminary sketches of the facilities specified.

10. The committees study the preliminary sketches, noting particularly the functional arrangement of facilities and the extent to which educational specifications have been achieved.

11. When agreement has been reached as to the most promising and acceptable plan, the architect prepares a more detailed design of the building; including specifications as to the materials to be utilized in all areas.

12. Since the specific functions of all special committees have been completed at this point in the planning process, and from the standpoint of promoting greater speed and efficiency in construction of the building, all committees are disbanded with the exception of the small planning committee appointed by the president.

13. A final check of all working drawings and specifications is made by architects, consultants, engineers, and the planning committee.

14. When the building has been completed, the chairman of the planning committee, architects, inspector, and contractor make a careful inspection of every detail of construction, checking all workmanship against previous specifications.

15. A list is made of all defective workmanship or building features which are not in accordance with the approved specifications. A future date is stipulated, at which time all items on the list are to have been corrected.

16. Upon final completion of all items on the list, and after a final check of all facilities by the persons mentioned above, the "acceptance of the building" is signed by the committee chairman, architect, inspector, and contractor.

Selection of Architect

The selection of a competent architect should be made only after careful consideration of his professional training and experience, past accomplishments, the work for which he is presently under contract, and his availability. In many instances, however, architects are employed by the state for the planning of structures at state institutions. Local institutions, under state board of control jurisdiction, may have little authority in the matter of selection.

It is desirable that the architect employed have had some experience in the planning of constructions similar to that being considered. Certain architects throughout the country have specialized in the planning of physical education facilities. Persons with such experience possess a more comprehensive knowledge of the problems peculiar to physical education buildings, and their experience should contribute to the successful and efficient completion of the planning process.

It might be a mistake to employ an architect who currently is engaged in several other building ventures and, consequently, could not devote an appropriate share of his time and efforts to the task at hand. It also may be unwise to employ an architect whose offices are located so far from the site of the proposed construction that he is not readily available for consultation. The availability of the architect should be more than a minor consideration in the matter of selection.

Photographic Records of the Construction

The need for photographic records of the actual building construction program should not be overlooked. Such evidence, obtained at each stage of the building's construction, may prove to be of great value should any question as to faulty workmanship arise either during construction or after the building has been completed.

The university photographer, if such a person is employed, should be instructed as to the type of pictures desired and should be called at each stage of facility development.

The photographic record should, logically, be filed in the office of the planning committee chairman.

CHAPTER I I

THE RELATIONSHIP BETWEEN PROGRAM AND FACILITIES

The scope of the physical education program is largely dependent upon the amount and kind of facilities provided at the local institution. Maximum participation by the student body is made possible only when those authorities responsible for the planning of facilities have considered all factors which, both directly and indirectly, affect participation. These factors may be enumerated as follows: (1) the type of program offered; (2) characteristics of the institution; (3) local departmental policies pertaining to the administration of the program; and (4) the multiple use of facilities in the program.

For the sake of clarity, these factors will be considered in the light of their individual importance to the problem of facilities.

The Type of Program Offered

There is some question as to the most desirable type of physical education program in an institution of higher learning. It is entirely possible and highly practical, however, to gain local direction by studying the recommendations of certain professional conferences and organizations. Such recommendations provide a sound basis for determining national trends and possible future program changes.

The following are excerpts from the committee report of the Third National Conference on Health in Colleges:[1]

> A worthwhile physical education program should include a wide variety of experiences and activities adapted to individual interests, capacities and needs. Consequently, opportunities for participation in aquatic activities; dance; gymnastics; competitive athletics; stunts and tumbling; individual, dual and team sports; and prescribed special exercises and activities should be made available.
>
> It is desirable for each college student to acquire some skill in the above types of activities for which they have interest, aptitude and capacity.
>
> Physical education should be required of all students, preferably a minimum of a daily period five days each week or three double periods per week for at least a period of two years. A sound instructional program should be provided for those students who desire to participate on a voluntary basis beyond the two-year requirement.

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[1] Committee Report, Physical Education and Sports, Third National Conference on Health In Colleges, (Delbert Oberteuffer, Chairman), 1947, pp. 1-13.

Students should be encouraged to meet minimum standards in swimming. They also should attain skill above the novice class in at least one indoor and one outdoor recreative dual sport; such as handball, tennis, badminton, and squash, and at least one indoor and one outdoor recreative team sport; such as field hockey, volleyball, and softball. Appreciations and understandings are included in expected outcomes. Students below acceptable standards in their physical education should participate in the program beyond the minimum requirements established for all students.

The policy of excusing veterans from physical education or giving them blanket credit for military experience has been a great mistake in the post-war period. The nature of the program in the various armed services placed emphasis on "physical training" and is not comparable to modern physical education programs in objectives and activities.

The practice of granting physical education credit for participation in the college band, cheer leading squads, and military programs should not be permitted.

Physical education instruction should be individualized as much as possible. It is completely beyond the scope or purpose of a modern program to permit classes of 50, 100, or 500 as might have been the practice in "physical training" in years gone by. Opportunities should be available for participation in sports under game conditions as a part of the instructional program. A class size of approximately 30 students would be optimum. In no case should it exceed 40.

The athletic program should offer each individual an opportunity to develop himself to the limit of his capacities and skills. Colleges and universities should not confine their intercollegiate competition to two or three sports. There should be well-rounded programs extended to include a large variety of athletic activities to meet the needs, interests, and capacities of the greater number of students.

The recommendations presented by this committee represent the most advanced thinking of college physical education leaders from all parts of the nation. There is every reason to believe the recommendations of this group are indicative of current trends in the college program. It seems entirely logical, therefore, that the planning of indoor facilities may well proceed according to the type of program defined above.

By starting with the implications of a desired program of physical education, it is relatively easy to understand that the provision of adequate facilities is largely dependent upon the wise utilization of available funds. Neither the architect nor the engineer is qualified to ascertain the amount or kind of facilities needed. The first responsibility of program specialists is that of analyzing the program in terms of desirable facilities.

At the Third National Conference On Health In Colleges, the Committee on Facilities and Staff Qualifications recommended the following indoor facilities as being desirable for the previously outlined program.[1]

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[1] *Ibid.*, pp. 19-20.

A. Instructional-Recreational Facilities
   1. Rooms with special structural characteristics: (1) main gymnasium; (2) apparatus and tumbling room; (3) dance studio; (4) combatives room; (5) handball and squash courts; (6) bowling-riflery-archery and golf rooms; (7) solarium; (8) natatorium; (9) auxiliary gymnasium; and (10) striking bag room.

   2. Rooms with usual structural characteristics: (1) remedial and/or modified room; (2) classrooms; (a) audio-visual; (b) lecture-discussion; (3) laboratories; (4) seminar; (5) library; (6) club; (7) recreational; (8) special activity rooms; and (9) some colleges may want to include rooms for such activities as arts and crafts, photography, dramatics, music, and other hobbies in this building.

B. Service Facilities
   1. Student dressing-locker suites, including shower rooms, toweling rooms, dressing-locker rooms, towel and uniform storage, toilet.

   2. Faculty dressing-locker suite, including lounge.

   3. Team dressing-locker suites (home and visiting team); these may be included in a separate building, field house or stadium.

   4. Equipment-drying room.

   5. Emergency rest or cot rooms.

   6. Kitchenette, snack-bar.

   7. Spectator space (usually provided only with main gymnasium and natatorium).

   8. Foyer, check rooms, cloak room, public toilet rooms, telephone, ticket office, trophy cases.

   9. Health service.

C. Administrative
   1. Office suites, director and other staff members, including reception, conference, and clerical offices.

   2. Control, supervisory stations.

   3. Storage rooms - main gymnasium, seasonal supply, dead-storage, records, repair, check-out.

   4. Custodial rooms (including toilet and shower).

   5. Laundry.

The committee's recommendations that physical education be required of all students a minimum of one daily period five days each week or three double periods per week for at least a period of two years, and that no other college activities be substituted, is directly related to the concept that physical education is no longer considered a service to education but, rather, an integral part of education.

The provision of a well-rounded program implies that facilities must be planned which are adequate to handle the increased demands of required, intramural, inter-collegiate, and recreational activities. It is no longer feasible to provide one basketball floor, two handball courts, and one small apparatus room. Planning must be in terms of the numbers which the facilities must serve. The modern program of physical education requires an extension of facilities, just as the increased enrollments of our colleges necessitate an increase in dormitories, classrooms, laboratories, and libraries. It is essential that the planning of facilities proceeds in terms of the maximum number of students to be served at any time of the day.

A definite trend is noted in physical education programs since the war years toward the offering of instruction and experience in a wide variety of recreational sports and activities. This has been a natural outcome of the leisure-time problem which is, today, one of the foremost facing an industrialized and urban American society.

The college should consider not only the recreational problems of students during their short stay on the campus, but should also make every effort to prepare them for an abundant recreational life during later adult years. By the nature of its program, the physical education department is particularly well adapted to provide instruction and experiences in a variety of sports and activities which may be engaged in during present and future years. Such sports as golf, tennis, badminton, handball, squash, bowling, dancing, archery, swimming, and volleyball are particularly worthwhile in a physical education program from the standpoint of their recreational value during both college and post-college life.

It appears desirable that institutions of higher learning might well develop programs of physical education based primarily on the recreational needs and interests of their students and graduates. For example, a survey of the recreational interests of Columbia University graduates by Adams[1] might serve as a vehicle for improving and evaluating the program at that institution. The requirements at Columbia specify that each student attain reasonable skill in each of the following areas prior to graduation: (1) recreational team sports, (2) recreational individual sports, and (3) recreational dual sports. The major objective of such a program is that each student will not only attain a reasonable amount of skill and knowledge in these areas but will continue participation after school hours and in adult life. A similar survey has been made at Ohio State University.[2] If the recommendations of the authors and groups mentioned are accepted by those authorities responsible for curriculum construction, it appears that an increased number of colleges and universities will offer the required-elective program as a means of meeting recreational needs of students and educating for societal living. Brownell and Hagman[1] emphasize the principle of the required-elective program as follows:

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[1] L. C. Adams, "Active Recreational Interests of Columbia College Alumni," American Association for Health, Physical Education, and Recreation, Research Quarterly, 19:43, March, 1948.

[2] J. G. Mason, "Postwar Interests in Physical Education at the Ohio State University," American Association for Health, Physical Education, and Recreation, Research Quarterly, 19:215, October, 1948.

> "The program should contain a minimum of mass and prescribed activities, and a maximum of activities chosen by the student under sound guidance and taught by skilled teachers to small groups".

The implications of the required-elective physical education program to the problem of planning facilities are evident. The college, in planning for an extensive recreational instruction program, must provide the facilities needed in such a program, and these facilities must be adequate in kind and amount to serve an entire class in each activity under actual game conditions. All too often in the past the physical education building has been planned in terms of an occasional game of handball, bowling, or table tennis; the concept being that a few students can, in their spare time, drop into the building for a casual hour of recreation. The facilities may be adequate in kind but totally inadequate in amount. Planning of this nature does not provide for the needs of the required instructional program; neither does it provide the pre-requisites for a broad intramural and recreational sports program. Such provision is but a false pretense in meeting student body needs. A broad and diversified physical education program, as recommended by the committee at the Third National Conference On Health In Colleges, is possible only to the extent to which facilities permit.

The extension of the intramural and intercollegiate sports program is, again, directly related to the problem of available activity and service areas provided in the physical education building. An extension of the intercollegiate and intramural sports program is possible only when facilities provide for instruction and participation in a number of sports at the same time.

Characteristics of the Institution

No two institutions of higher learning are ever identical in character. This fact makes impractical the common practice of copying facilities of another college, or building according to a single standard design. The construction of facilities for the program should proceed only after a thorough study has been made of those unique characteristics possessed by the local institution. Such factors as geographic location, climate, student enrollment, and the type and purpose of the institution will definitely influence the kind and amount of facilities needed for the indoor program.

Geographic Location

Activity areas should be planned in the light of seasonal sports. Where a relatively mild climate exists there will not be the same need for extensive indoor facilities as in the northern regions of the United States. The college in Florida or southern California, for example, is so located that emphasis will be placed on an outdoor sports program the year round. Consequently, the planning of indoor areas need not provide for the duplication of those facilities found outdoors. The new physical education building at the University of Florida is an excellent example of the achievement of balance between indoor and outdoor facilities, with a resulting economy of funds being reflected in wise planning. In northern climates, on the other hand, the outdoor building program is restricted by the considerations of a limited outdoor sports season. Outdoor swimming pools, handball courts, and basketball, volleyball and shuffleboard courts might not be justified in terms of their limited utility. Large expenditures for the provision of extensive indoor activity areas is justifiable by the fact that the physical educational program during the academic year is largely of the indoor type.

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[1] C. L. Brownell and E. P. Hagman, Physical Education Foundations and Principles, New York, McGraw-Hill Book Company, 1951, p. 314.

Despite the geographic location of the institution, those persons responsible for planning should be guided by the principle that facilities should be planned and developed to take advantage of local geographic and climatic conditions so that opportunities are available for students to participate in both indoor and outdoor activities throughout the year. Consideration should be given to the continuation of outdoor activities such as golf, tennis, and archery during inclement weather. The provision of indoor golf cages, archery ranges, and areas suitable for backboard tennis practice eliminate one of the administrative difficulties arising at the average institution when inclement weather necessitates the abandoning of outdoor facilities.

Factors other than climate are of considerable importance to the planning of facilities in relation to geographic location. In regions of the country where high winds, floods, earthquakes, excessive dampness or dryness are not uncommon, roofs, walls and foundations must be specially constructed to withstand these elements. Where termites pose a construction problem, special protection is required by preventing the exposure of underpinning and sills to dampness, by avoiding ground connections to wood parts, and impregnating the wood with chemicals toxic to the termites.[1]

Although certain building materials are recommended in this study as being most desirable under ordinary circumstances, it should be recognized that the particular geographic location of the educational institution may be such that satisfactory materials other than those suggested are more readily accessible, and possibly less expensive.

Student Enrollment

The construction of the physical education building should be planned in direct relationship to present and anticipated future student enrollment. The violation of this principle has been the general rule rather than the exception, however. Buildings have been planned, even in recent years, in terms of a totally inadequate and narrow concept of student participation. The lack of foresight on the part of those responsible for planning has been, in large measure, the primary reason for such program deficiencies and administrative difficulties as are prevalent today in institutions of higher learning throughout the country. The lack of facilities, coupled with great increases in enrollment, have, in many instances, forced the curtailment of the physical education program. To relieve the situation, it has been a common practice for the administration to grant blanket exemptions for all veteran students, to exempt students over the normal college age and, in many institutions, the program has become solely elective.

During the years immediately following the war, there appeared a reluctance on the part of many college authorities to inaugurate a construction program. This "sit tight" attitude was perhaps attributed to the following beliefs: (1) a general feeling that student enrollment would return to the pre-war level when veteran students completed their education, (2) the inflated cost of building materials and labor, and (3) a feeling the eventual decrease in government subsidies under Public Law 346 (the G. I. Bill) and Public Law 16 (Vocational Rehabilitation of Veterans) might place the institution in serious financial straits.

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[1] Edward F. Voltmer and Arthur A. Esslinger, The Organization and Administration of Physical Education, 2nd ed., New York, Appleton-Crofts, 1949, p. 191-92.

The passing of time has shown a continued and steady increase in student enrollment, even after the termination of the G. I. Bill, and it seems reasonable to believe that both student enrollments and government assistance will continue to rise. Continued high enrollments necessitate broader programs and increased facilities for educational opportunities.

The program specialist will best serve his function on the college building committee when he is able to recommend the kind and amount of facilities needed in the local situation in terms of their actual service to present and probable future student enrollment. To carry out his responsibilities, the program specialist should be familiar with enrollment trends, possible future changes in the program, and certain approved standards for facilities.

Available Funds for Building

Where adequate funds for construction are readily available, the optimum will be possible in both kind and amount of facilities to serve the program. Where funds are limited, the time and effort spent in planning will more than pay dividents in value received. A limited amount of building funds does not necessarily imply the provision of inadequate facilities. This fact should be emphasized. A less extensive structure in a small college may be made, through efficient planning, a more functional building than many that now exist in larger and more financially fortunate institutions. Those facilities provided may be made adequate through utilizing less expensive, yet satisfactory, building materials; limiting spectator seating accommodations; eliminating the construction of many small and unnecessary rooms and rooms which are odd-shaped or many-sided; avoiding the provision of ceiling height greater than that actually needed in the functional utility of the room; and eliminating the waste space so commonly found in locker and dressing areas.[1] The maximum activity space may be obtained by providing for the multiple use of facilities, and by limiting administrative and service units to minimal space essential to meet the criteria of efficiency, comfort, and sanitation.

Functional planning should be as much concerned with the intelligent utilization of building funds as with the provision of adequate facilities to serve the desired program. Functional planning, in its very essence, is responsible for the construction of facilities which provide the maximum utility in terms of the minimum amount of expenditures.

The Type of Institution

Those responsible for the planning of a construction program should devote more than casual attention to such local factors as the purpose of the institution, the makeup of the student body, and the prevailing philosophy of administration.

The college or university that offers professional training courses leading to the bachelor's degree in physical education, health education, and recreation should provide the facilities necessary for an adequate teacher-education program. Facility standards for the teacher-education program should include: (1) a swimming pool or natatorium, (2) all desirable facilities for the sports activities to be taught, (3) a health service, (4) departmental library, (5) research facilities, (6) lounge, (7) club room, (8) projection room, and (9) classrooms.

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[1] E. F. Voltmer and A. A. Esslinger, op. cit., p. 185.

The institution that enrolls both men and women students must provide for the joint use of facilities for co-physical education and co-recreational programs. Even where separate buildings are provided for both sexes, separate dressing and shower facilities should be maintained in each; these serving such common recreational areas as the main playing floor, natatorium, recreation room, dance studio, bowling alleys, and archery range.

It is advisable that institutions enrolling only men or only women students give due consideration to the provision of facilities and service areas for a co-recreational program.

Those responsible for planning should give careful attention to the educational philosophy practiced at the local level. The existing philosophy is of importance in the provision of facilities to serve a specific program. One needs only to visit a few of our colleges and universities over the nation to realize that in many instances a varied sports program is being carried on despite the fact that facilities originally were planned for a narrow, out-moded, formal program of physical education. There can be no doubt that the planning of buildings to house the program has oftentimes been done by persons having no connection with the physical education department, or by individuals having little knowledge of a modern program.

Local Departmental Policies

Successful administration of the physical education program depends upon the soundness of departmental policies and procedures. Any department that is to function adequately must have sound, well-established administrative policies, or guiding rules, as a basis on which to operate. It would be unwise for a construction program to proceed without a thorough examination of the administrative policies which have been established by the physical education department.

The following factors are important to the establishment of departmental policies and, therefore, important to the problem of facility construction.

The desired type of program. Programs of physical education may be classified roughly into three types:[1] (1) those emphasizing formal or response to command activities; (2) those emphasizing typical American sports and games; and (3) those attempting to strike a balance between the two. Within the general type of program dictated by the administration, each institution prepares a course of study designed to carry out its educational philosophy.

As a general rule, modern programs are dedicated to the policy that students learn through experiences in natural games and activities. Traditional teaching methods and formal exercises, conducted primarily for the purpose of developing obedience and discipline, and activities which are fundamentally directed toward the development of physical strength, can scarcely be termed physical education in the accepted sense.

The physical education building should be constructed only after considerable study of the scope of the program it is to house.

Time allotment. Facilities should be planned to accommodate the numbers who will use the building during any period of the daily instructional schedule. Efforts should be made to expand facilities to provide for a broad recreational and intramural program for those who desire to participate on a voluntary basis beyond the minimum requirement established for all students.

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[1] J. F. Williams and C. L. Brownell, The Administration of Health and Physical Education, Philadelphia, W. B. Saunders Company, 1946, p. 203.

Exemptions. The local policy governing exemptions from the physical education program, and its effect upon participation, is a factor for consideration in the planning of facilities. The policy of exempting students who, through the health examination, are found to have physical defects has been replaced by the concept that most students, despite certain physical limitations, will benefit from guided and supervised participation. It is recommended that institutions of higher learning provide special facilities for an adaptive and corrective physical education program.

Class size. Efficient instruction in physical education activities is only possible where existing facilities are adequate to handle the number of students involved. No longer is it deemed feasible to attempt the instruction of 50, 75, 100 or more students in an activity, particularly when facilities are not adequate to effectively handle these numbers. It is important that a departmental policy be established whereby class size is limited to such numbers as can be handled under game conditions in each activity.

From the standpoint of facility construction, planning should consider the departmental policy relating to desirable class size, and construction should then proceed in view of the adopted policy. For purposes of clarification, the following example will illustrate the point made. Where the desired class size is stated to be 40 students, this suggests 10 handball and squash courts, 4 basketball courts, 3 volleyball courts, 10 badminton courts, an adaptive-corrective room of sufficient size and adequately equipped to handle 40 students, a combatives room, at least 5 bowling alleys, and an archery range equipped with sufficient targets to provide participation for 40 students during the class period.

The Multiple Uses of Facilities in the Program

The design and construction of facilities should be at least partially determined by their possible multiple uses in the program.

The program specialist should make a functional analysis of the facilities under consideration in such a manner that designers will have available all information necessary for proper planning and construction of the facilities.

He should provide the following information:[1]

1. The purpose for which the facility is to be used.
2. The number who will use the facility.
3. The conditions under which the facility will be used.
4. Time and frequency of use.
5. Special features required in the design and construction of the facility to give it the maximum degree of usefulness.
6. Special design of the facility to allow for possible future program changes.
7. Sources where designers may secure additional information as to standards governing the use or design of the facility.

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[1] H. A. Scott, Syllabus, Physical Education Facilities and Equipment, New York, Teachers College, Columbia University, 1947, p. 1.

Given the above information, architects and engineers are in a better position to design a building which meets the needs of the student body and achieves the objectives of the program.

The factors listed above will be used as a basis for discussion of specified facilities in succeeding chapters.

CHAPTER I I I

THE PHYSICAL EDUCATION BUILDING

The increased interest in physical education and recreational activities during the past few decades, combined with a change in the emphasis of the program from formal activities to a broad sports program, has created an entirely different viewpoint on the problem of planning and constructing physical education buildings. The present demand is for a structure in which the entire student body and faculty may participate in an extensive variety of sports activities throughout the academic year. Such a building necessitates the provision of many areas and facilities not found in older structures.

At many institutions the modern field house has replaced the gymnasium, since this type of structure offers most of the advantages of the old gymnasium as well as many of the desirable features of outdoor athletic fields. This is especially true in sections of the country where the winter months are severe. Several institutions have provided both a field house and a gymnasium, and others have constructed a combination of the two. Whether a field house, a gymnasium, or a combination of the two is erected, the functional utility of the structure will depend in large measure on the extent to which the planning group is able to provide the most desirable and economical arrangement of facilities.

Location and Arrangement

Location - The location of the physical education building on the college campus definitely affects its serviceability. The extent to which the building is used by students and faculty is largely dependent upon its accessibility to these groups. Ideally, it should be located convenient to student residential areas and, at the same time, be as near as possible to the geographical center of the campus.

A building erected at the edge of the campus has many disadvantages from the standpoint of student participation. The student who must run across the campus from the physical education building in order to be prompt in attendance at an academic class meeting can hardly be criticized if he occasionally absents himself either from the physical education program or from the academic class. Participation in intramural and recreational sports activities may be seriously hampered where facilities are located an excessive distance from student residential areas. Students do not tend to drop into the building for a recreational hour of handball or basketball when the location necessitates a half hour's walk to reach the activity areas and a half hour's walk to return to the dormitory or fraternity house.

Since the physical education plant is a center of campus activities, it should be located in a pleasant environment near the center of the campus, where all who wish to use the facilities may find it conveniently accessible. The building should follow or blend in with the pattern of architecture found on the campus, should be surrounded by attractive lawn and shrubbery, and should present esthetic "eye appeal" rather than stand as a "sore thumb" amidst its surroundings. The nature and purpose of the building need not lessen its attractiveness.

The location of the building should be determined with regard for the outside areas it serves, being situated, if possible, in the center of outdoor activity areas. The building should be planned, also, with a view to possible future expansion of outdoor areas. All too often institutions have erected the physical education building a considerable distance from outdoor activity areas, or in a region of the campus where expansion of outdoor areas is impossible. Only a limited or crowded program can result when such a situation exists.

It is not uncommon for an institution to find itself in the unenviable position of having to expand outdoor areas at a distant part of the campus from locker and dressing facilities or being forced to curtail the outdoor program because available ground areas are being utilized for the construction of other campus developments.

Care should be taken to locate the building in an environment where activities, both indoors and outdoors, will not prove a disturbing influence to other campus activities. The building, for example, should not be located adjacent to the college hospital or to academic classroom buildings. For obvious health reasons, the physical education building and its outdoor area should not be located on a poorly drained site or near factories, dumps, main thoroughfares, railroad yards, dust, unpleasant odors or distracting noise.

Although this book is primarily concerned with the physical education building and the indoor facilities therein, it seems of importance to report here certain recommended outdoor activity area standards. Their relationship to the study of building location is based on the assumption that desirable construction is partially dependent upon the availability of space for outdoor activities. Suggested standards for outdoor areas are presented in Table I.

The increasing trend in the direction of co-physical education and co-recreation activities should prompt members of the planning group to consider the location of both the men's and women's buildings with a view to joint use of outdoor areas such as tennis courts, athletic fields, golf facilities, and outdoor swimming pool (if provided).

The location of the building in relation to available spectator parking accommodations should be given careful consideration. Accessibility of parking area is of particular importance, inasmuch as the physical education building will be used by large numbers of persons for many different campus functions. Parking areas should not be provided on land that is utilized for activities of the outdoor program if its use for this purpose interferes with the normal conduct of the program. Several institutions have provided a hard surfaced activity area adjacent or near the building which adapts itself easily to a parking area for handling large crowds at basketball games or other functions in the building.

Layout of the building - The physical education building should be an attractive structure, but not ornamental or gaudy. The architectural design, both inside and out, should be in keeping with the traditions of the campus. Building funds should be spent on activity areas and service facilities rather than on marble corridor walls, ornamental towers, or other building features which are largely of a decorative nature.

From the standpoint of maximum utility and economy, it is usually wise to limit the structure to no more than two floors. Modern physical education buildings should include as many interrelated acitivity areas and service units as possible on the same floor level.

TABLE I

BASIS FOR DETERMINING LAYOUT AND NUMBER OF OUTDOOR ACTIVITY UNITS[1]

Key:
1. Number of Courts, Fields, Targets, etc.
2. Number of Players per Activity Unit.
3. Number of Players for Class Purposes Under Game Conditions.
4. All Weather Surfacing.

Activity	Men	Women	Joint Use	Intercollegiate Athletics	1	2	3	4	Camp Site	Remarks
Apparatus	X				1	40	40			Area for six removable climbing ropes and 4 multiple height chinning bars.
Archery			X		10	4	40			Isolated area.
Badminton			X		10	4	40	X		Multiple use of volley ball and basketball courts and field areas. Joint use on hard surfaces only.
Baseball	X			X	2					Outfield available for class instruction.
Basketball			X		4	10	40	X		Court size 45' x 90', 12' end lines to fences, 10' between courts and obstruction.
Boating			X						X	
Bowling on Green			X		8	(alleys) 40	40			
Camping			X		1				X	
Dancing			X		1				X	
Field Ball		X			2	22	44			Multiple use of field areas.
Field Hockey		X		X	2	22	44			Multiple use of field areas.
Fishing			X						X	

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[1] The College Physical Education Association, op. cit., pp. 83-84.

TABLE I (Continued)

Activity	Men	Women	Joint Use	Intercollegiate Athletics	1	2	3	4	Camp Site	Remarks
Fly and Bait Casting			X		1	40	40			
Football				X	2					Practice and Varsity field.
Golf	X	X			1	40				
Handball	X				10	4	40	X		
Hiking Trails			X						X	
Horseshoes	X	X			10	4	40			
Ice Hockey	X			X	1					
Ice Skating			X		1	40				
Lacrose			X	X	1	24				Intercollegiate for men. Other field areas also used for classes.
Picnic Area			X		1				X	Campus and camp site.
Riding Horseback			X						X	
Ring Tennis		X			10	4	40	X		Multiple use of fields and/or hard surfaced areas.
Rowing			X	X	1					
Shuffleboard			X			4		X		
Soccer	X	X		X	2	22	44			Also intercollegiate field.
Soft Ball	X	X			8	18	72			4 for men and 4 for women. Multiple use of field areas.
Speedball	X	X			2	22	44			
Swimming			X	X					X	
Tennis			X		20	4	40	X		Joint use for class instruction only.
Touch Football	X				2	18-22	36-44			Multiple use of field areas.
Track	X	X		X	1	40				Men - 4 jumping pits. Women 75 yard running track.
Track and Field				X	1	40				
Volleyball			X		4	12	48	X		
Winter Sports			X						X	Both campus and camp site, if possible.

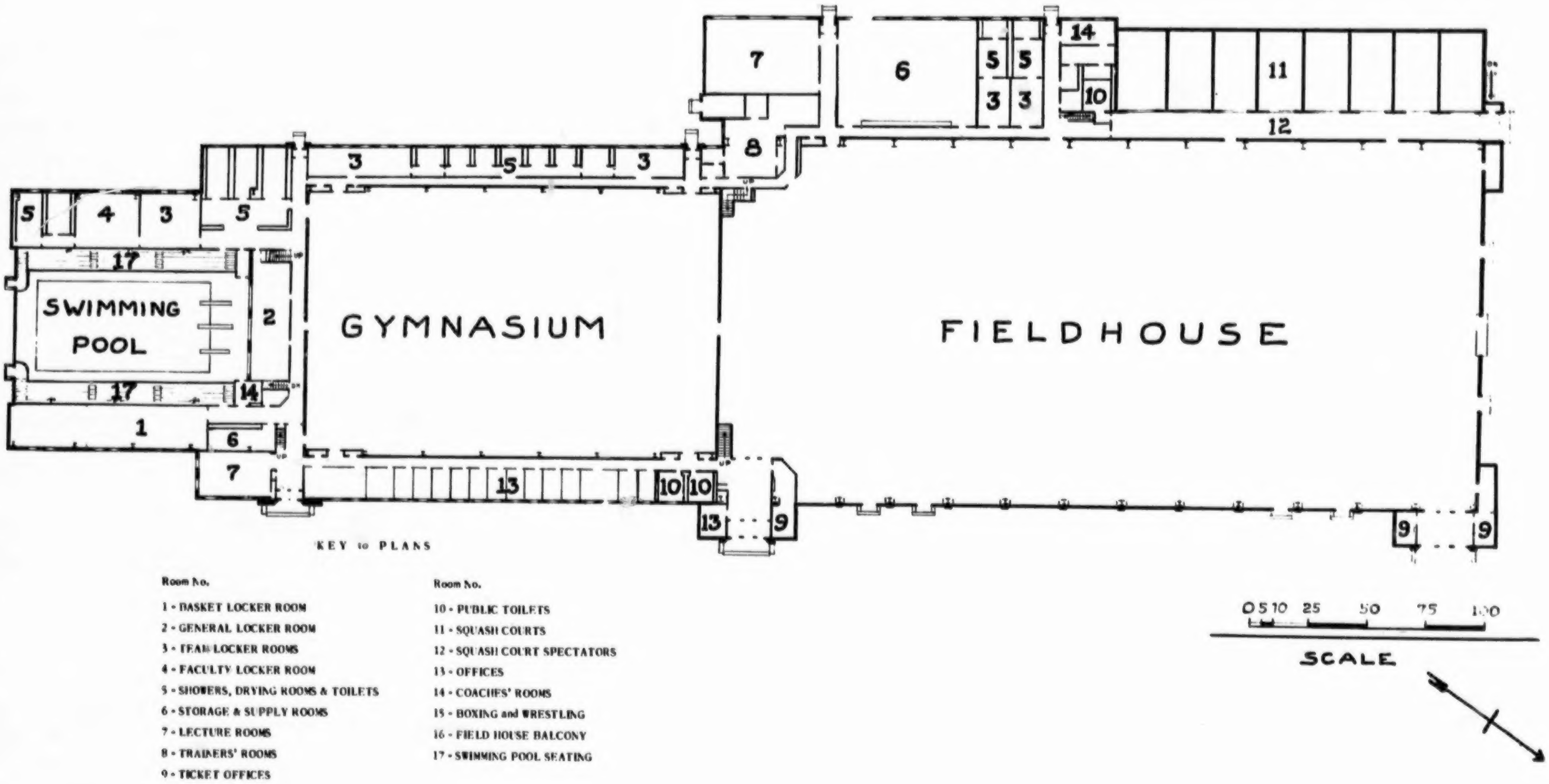
SWIMMING POOL
GYMNASIUM
FIELDHOUSE
1
2
3
4
5
6
7
8
9
10
11
12
13
14
17
KEY to PLANS
Room No.
1 - BASKET LOCKER ROOM
2 - GENERAL LOCKER ROOM
3 - TEAM LOCKER ROOMS
4 - FACULTY LOCKER ROOM
5 - SHOWERS, DRYING ROOMS & TOILETS
6 - STORAGE & SUPPLY ROOMS
7 - LECTURE ROOMS
8 - TRAINERS' ROOMS
9 - TICKET OFFICES
Room No.
10 - PUBLIC TOILETS
11 - SQUASH COURTS
12 - SQUASH COURT SPECTATORS
13 - OFFICES
14 - COACHES' ROOMS
15 - BOXING and WRESTLING
16 - FIELD HOUSE BALCONY
17 - SWIMMING POOL SEATING
0 5 10 25 50 75 100
SCALE

FIGURE 1. Layout of Gymnasium and Field House, University of Connecticut, Storrs, Connecticut. Courtesy of University of Connecticut.

The activities of the physical education program naturally group themselves into certain interrelated units. The administrative unit includes the central administrative offices and staff offices; the service unit includes equipment supply rooms, locker rooms, shower and toweling rooms, and toilet and lavatory facilities; and the instructional unit includes gymnasium and auxiliary teaching rooms, special activity areas, and corrective (adaptive) facilities. All units mentioned should be as functionally related as possible. It is from the standpoint of functional arrangement that intelligent planning will eliminate a vast majority of the administrative difficulties that arise in the typical physical education building.

The Lobby

The visitor usually gains his first impression of the physical education building's inner structure upon entrance into the main lobby. In most instances, the lobby is located at the front of the building on the first floor.

The lobby should be an attractive area and, in addition, should serve a variety of functional uses. It should serve the purposes of traffic circulation, information, the sale and exchange of athletic tickets, and should provide access to administrative offices, spectator seating accommodations, classrooms, dressing rooms, and activity areas. It may also serve as a lounging area for students and visitors, and as a display area for athletic trophies. Because the lobby will serve as a focal point for large numbers of persons attending athletic contests or social activities, it should provide access to such public conveniences as cloak room, toilets and lavatories, drinking fountains, and telephones. Corridors and stairways leading from the lobby to other parts of the building should be so planned and arranged that spectators, visitors, and students do not have to cross playing floors or interfere with activities.

At least two sets of large double doors should be provided for entrance to the lobby from the outside. These doors should open outward, and should be equipped with anti-panic hardware. They should be constructed of durable material and should be of sufficient height and width to permit passage of equipment and heavy apparatus that may be used in the gymnasium. The use of heavy duty glass doors provides cheerful natural lighting of the lobby area. In no case, however, should ordinary glass doors, or doors with breakable glass panels, be used in this area. If doors to the main gymnasium floor are provided from the lobby, they should be of sufficient height and width to permit passage of all equipment which may be used on the playing floor such as heavy apparatus, piano, tables, speaker's platforms, and mat trucks.

Persons passing through the lobby will usually be dressed in street clothes and will be wearing leather soled shoes. During inclement weather, considerable water and dirt will be tracked into the area. The floor of the lobby, therefore, should be of such material as to withstand considerable wear and tear, provide a slip-resistive surface, be water resistant, permit ease of cleaning, and be attractive to the eye. If a short flight of steps or a ramp is provided for access to the lobby level from outside doors, these should be of non-skid material and equipped with hand rails.

Lower walls may be of brick, glazed brick or tile, wood panel, or plaster. Glazed brick or tile are more desirable since they are readily cleaned and will stand up under considerable abuse. Upper walls and ceilings should be light in color, acoustically treated, and of such material as to permit ready cleaning.

Where athletic trophies are to be displayed in the lobby area, it is recommended that they be housed in cabinets recessed flush with the wall. These cabinets may be constructed of wood or metal frames and sashes, with heavy plate-glass doors and shelves.

The doors should be equipped with locks which are as tamper-proof as possible. A pleasing effect may be achieved through the use of mirror backs in trophy cabinets. The provision of indirect lighting in cabinets, or spotlights which are recessed in the ceiling, is suggested as a means of lighting the trophy display.

For the convenience of students and visitors, it is desirable that a building directory be located on a wall of the lobby near the entrance. The directory should be of such size as to be plainly visible, should be covered with a glass panel or door, and be so lighted as to be functional at night.

A large, electrically illuminated tackboard should be provided on one wall of this area for the posting of notices to students and the public. This should be recessed and flush with the wall, and covered with a locked glass door to facilitate neatness and to prevent marking and disturbance of posted material. The location of the tackboard should be such as to quickly catch the eye of persons entering the building, and should be placed at a height convenient for reading without the necessity of bending or stretching.

Cloak Room - Space provision should be included for the storage of outer clothing and packages while the public is in attendance at athletic contests or social functions. A separate room should be provided for this purpose, preferably located off the lobby but in the direct line of traffic from outside entrances to the main playing floor or spectator areas. The cloak room and its equipment should be adequate to accommodate the needs of the average number of persons in attendance at activities.

This area should be equipped with coat racks, hat racks, and shelves for the storage of packages. The racks should be arranged in rows, with aisles of sufficient width to permit freedom of movement. The ends of the rows should be facing the counter, thereby permitting quick access to racks by attendants. Racks and shelves should be permanently numbered.

The cloak room counter may be either located in a wall of the lobby or provided on the lower half of a dividing door. The former method is more desirable, since the working counter should be of sufficient length to accommodate large numbers of persons in a short period of time. To provide maximum utility, the counter should be at least 5 feet in length, 2 feet in width, and located at a height of approximately 3 feet from the floor. It is important that the counter extend into the cloak room area rather than into the lobby.

For the convenience of attendants, it is suggested that a shelf be provided underneath the counter opening for the purpose of permitting easy access to hat checks, coin boxes, or other items necessary to the function of the room.

Ticket Windows - It will be necessary in the planning process to provide facilities in or adjacent to the lobby for the sale and exchange of athletic tickets. Many institutions have found it advantageous to provide grilled ticket windows along at least one wall of the lobby, these windows being on a direct traffic line between the main outside entrances and spectator seating areas. The number of such windows should be adequate to handle large crowds in a minimum amount of time.

From the standpoint of economy, efficiency of function, and maximum utility, it is advisable that ticket windows open from the lobby into the staff office of the business manager, publicity director, or director of athletics. Such an arrangement eliminates the necessity of providing separate space for the sale of tickets, makes it possible for the office staff to serve the windows at all times during the day, and permits easy access to filing cabinets, storage and supply closets, and the safe where athletic monies are kept.

It is functionally important that ticket windows should not be located directly inside the building entrance, as this may force lines of ticket buyers to stand outside during inclement weather. It is further suggested that windows not be located where ticket lines interfere with access to toilet rooms, drinking fountains, cloak room, or stairways.

Glazed glass or metal windows should be provided for openings through the wall, thus making it possible to close and lock ticket windows when not in use.

Toilet Rooms - Toilet and lavatory facilities should be provided for the convenience of those attending athletic contests or social functions in the physical education building. These should also be available for students, staff members, clerical personnel, and visitors at times other than during the program of special events. Separate facilities should, of course, be provided for both sexes.

The location of these areas should be convenient to the cloak room and spectator seating accommodations. From the standpoint of economy, it is advantageous to place toilet and lavatory facilities for men and women in adjacent rooms, thereby permitting use of the same water and drain pipes for both areas. Some authorities discourage this practice, however, maintaining that toilet rooms for men and women should be located on opposite sides of the lobby. Where toilet rooms are adjacent, sound proof separating walls should be provided.

To prevent a view of toilet room interiors from the lobby or corridor, it is desirable that screening baffles be located inside the entrance. If windows are placed in toilet room doors, they should be of glazed or frosted glass. Toilet room doors should be plainly marked.

It is suggested that a small lounge or powder room, equipped with comfortable chairs, makeup tables, and mirrors, be included as a part of the women's room. This area should be separated from the toilet and lavatory facilities by means of a partition. A full-length mirror, recessed in the wall and located near the exit, would be appreciated by those who use the room.

Telephone Booths - For the convenience of students and guests, coin-operated telephone booths should be provided in the lobby. It is desirable that these be sound-proofed and recessed in the wall. The location should be such that traffic lines to ticket windows, cloak room, or spectator seating space will not prove a disturbing factor to those using the booths.

Stairways - Stairways leading from the lobby to spectator seating areas should be of sufficient width and number to handle the seating capacity of the area in a minimum of time, and should be of sufficient size and number to permit all building occupants to move out-of-doors within three minutes in the event of an emergency.

The location of stairways should be planned with a view to the normal routing of traffic from the main entrance to ticket windows, cloak room, and then to stairways. The placement of stairways leading to spectator areas should, ideally, be at the far end of the lobby or off corridors leading from the lobby. Care should be exercised in the original building plans to permit access to spectator seating without the necessity of having crowds travel through long corridors.

The entrance to bleacher areas from stairways should be such that the spectator does not interfere in any way with the sports he is to view. It is preferable that entrances be at the rear of seating accommodations rather than at the front. Spectators should be kept off playing floors at all times.

Drinking Fountains - At least one drinking fountain should be provided in or near the lobby for the convenience of students, guests, and building personnel. Drinking fountains should be located convenient to spectator seating areas, but care should be taken in their placement to prevent congestion in the traffic lanes.

It is desirable that drinking fountains be recessed in the wall, be of the type which prevents the user touching his lips to the source of water in the fixture, and be equipped with catch basins and splash shields. Water for these fountains preferably should pass through an effective cooling unit.

Clock - A large clock should be provided in the lobby. A desirable location would be on the wall opposite that of the building entrance.

The clock should be recessed in the wall and protected by an unbreakable cover. This clock, as well as others in the building, should be controlled by a central system originating in the director's office.

Consideration should be given to a means of lighting this clock during evening hours and dark days.

Administrative Office Suite

Educational administration no longer follows the theory that the head of the department should be housed in an isolated office, or that the offices of the staff members should be located adjacent to those activity areas which they supervise. Modern principles of education proceed on the assumption that, for optimum administrative efficiency, all staff and clerical offices should be grouped in what is referred to as the administrative office suite.

The administrative office suite should provide for the following uses: (1) work space for the department director, staff members, and secretarial and clerical personnel; (2) storage space for records, equipment, and supplies; (3) a reception area for students and visitors having business with administrative officers or staff members; and (4) staff meetings and conferences. It may be desirable, where teacher-training programs are offered, to provide a reading and study area for major students. Unless toilet, lavatory, and cloak room space are located convenient to staff offices, provision for these should be made.

Ideally, the administrative office suite should be located directly off, or convenient to the lobby, since persons having business with the director or staff members will usually enter the building by way of the main entrance. Students and visitors should not be forced to search the corridors in an effort to obtain information or locate those persons whom they wish to see.

Reception Room - The entrance from the lobby or corridor to the administrative office suite should, logically, provide access to an area planned for the reception of students or visitors having business with department personnel. Since it will be necessary for certain members of the secretarial or clerical staff to be on duty in this area, the room might well include a work area for those secretaries and clerical personnel employed by the department. The reception-waiting and work areas may be separated by a counter.

The functions of this room will include the following: (1) a reception-waiting area for students and visitors; (2) a work area for secretaries and clerical personnel; (3) the central storage of student records; (4) storage of supplies and equipment needed in office operation; (5) direct access to the office of the department director, and perhaps to other staff offices. In view of the typical functions of this area, certain recommendations for planning are suggested.

Sufficient natural and artificial lighting should be afforded by means of large windows and overhead indirect lighting fixtures. Walls and ceilings should be of a light cheerful color. To eliminate disturbing noises, acoustical treatment should be provided.

The need for a large storage closet adjacent to this area is often overlooked in the original building plans. Such a storage area is important for the storage of supplies, equipment, and records used by office personnel. The location of this closet should be adjacent to the work area of the room. Shelves of varying height, width, and depth should be provided. These should be planned according to materials and supplies to be stored.

The counter separating the reception and work areas should be of appropriate height and width to facilitate the checking of student records, filling out of forms, and other typical details carried on over the counter. The counter top should be approximately $3\frac{1}{2}$ feet from the floor and 2 feet wide. A smooth, durable working surface should be provided. It is desirable that shelves for the convenient storage of forms and other material for student distribution be located underneath and on the clerical side of the counter.

Office of the Department Director - The director of the physical education department should be located in a spacious and attractive office adjacent to the reception room. It is suggested that the entrance to this office be from the clerical work side of the counter, thereby permitting easy access for those staff and clerical personnel having business with the director and, at the same time, preventing the unannounced intrusion of students and visitors who do not have appointments.

The office of the department director should be planned for the following functions: (1) the normal desk work of the director; (2) staff meetings; (3) conferences with students, staff members, and visitors; and (4) the storage of personal books and materials.

This office should be of sufficient size to accommodate a large desk, several chairs, book cases, filing cabinets, dictaphone, storage cabinets, and a work table. If a separate conference room is not provided elsewhere for staff meetings, it is suggested that this room be of sufficient size to contain a large work table and enough chairs to seat the entire staff. It is recommended that a separate conference room be provided where the staff exceeds 10 persons.

Staff Offices - Office space should be provided in the administrative suite for each staff member. These offices should be planned as a unit, each being convenient to other offices, to the departmental library and conference room, to the director's office and to classrooms and activity areas.

Ideally, to permit the most satisfactory conditions for work and study, each staff member should be provided a separate office. In the interests of economy, however, some institutions have found it advantageous to provide a few large offices housing three or more staff members having similar duties and responsibilities, rather than several small, individual offices. Other institutions have provided one large office housing the entire staff. Still others have provided large offices for members of the various departmental divisions. Those members of the required physical education division are housed in one office, those of the teacher-training division in another, those of the health education division in another, and so on. The director of each division is provided with a small office adjacent to his staff.

Regardless of arrangement, each staff member should be provided desk space, chairs, a filing cabinet, and other equipment pertinent to the function of his specific duties. Adequate bookshelves and storage space should be provided in each office. It is extremely important that careful consideration be given lighting, heating and ventilation problems in providing cheerful, functional work areas.

It is desirable that this office be separate from other staff offices, and that it be located where students may enter directly from a corridor. Considerable inconvenience to other staff members may occur where the intramural sports office is in conjunction with other offices. Location of the office near student dressing rooms may be desirable, as students coming to the office for information are normally on their way to or from the dressing area.

A large tackboard located on one wall of the office is desirable for the posting of team standings, schedules, statistics, and other information pertinent to the work of the director and his staff. A separate, large, electrically lighted tackboard should be provided for notices and announcements to students concerning the program. Ideally, this should be located on a corridor wall near the intramural sports office and student dressing rooms. This tackboard may be covered with a glass front to facilitate neatness and to prevent students from tearing, fingerprinting, or otherwise defacing posted information.

Office of the Director of Athletics - In many institutions there may be a person, other than the director of physical education, charged with the administration and supervision of the intercollegiate athletic program. If such be the case, a separate office or suite should be provided, it being planned and equipped for such functions as are necessary for the efficient direction of activities associated with this position.

The office may be included as a part of the administrative office suite or it may be a separate unit. Regardless of this, the athletic director's office should be located convenient to the main entrance of the building where it will be readily accessible to the public.

The functions of the athletic office include the distribution, sale, and exchange of athletic tickets; distribution and storage of printed posters and information concerning athletic activities; conferences and staff meetings; the temporary storage of athletic monies; and the great amount of clerical work necessary in the conduct of athletic programs.

If the athletic director's office is not included as a part of the central administrative office suite, it may include a reception-clerical work area somewhat similar to that previously mentioned. The private offices of the athletic director, the athletic business manager, and the athletic publicity director (if these positions exist at the institution) should be located off the clerical work area.

Many institutions provide ticket windows in the wall between the athletic director's office suite and the lobby. If such provision is included in the building plans, these windows should be located off the clerical work area.

Since athletic monies may be stored in this office after games or meets, it is important that special precautions be taken to prevent burglarizing. Doors should be of sturdy construction and equipped with strong locks. A small safe should be provided.

Staff Dressing Room - It is desirable that a dressing area for staff members be included convenient to the administrative office suite. This unit should be located to facilitate ready access to both indoor and outdoor activity areas. In addition to serving the needs of the physical education staff, the staff dressing room may be utilized for athletic game officials or as a visiting team dressing room.

A detailed description of the functions of this area and the facilities to be included is presented in Chapter V.

Departmental Study Room or Library - If the institution prepares teachers of physical education, health education, and recreation, it may be desirable to include a separate space provision in the building for a reading and study room. Some institutions provide a departmental library for the purpose of making available to students those periodicals and books pertaining to the professional curriculum. The provision of a departmental library may raise serious objections from the central library, however, and may also necessitate assigning a supervisor to this area.

Where a separate study room or library is planned, it should be located convenient to staff offices. The function of the room may include, in addition to providing for reading and study, the storage of books, periodicals, films, and records.

Classrooms

The modern program of physical education is concerned not only with student participation in a variety of games and sports activities but is vitally interested also in the development of knowledge, attitudes, and appreciations. For purposes of lecture, discussion, demonstration, and study, there should be provided sufficient classroom space for the needs of the local situation.

The number of classrooms provided will depend upon current and possible future enrollment and, also, upon curricular requirements and offerings. If teacher-training programs in health education, physical education, and recreation are offered at the local level, there will be need for more rooms of this type than if the curriculum includes only a required or elective physical education and hygiene instruction program. It may be stated, however, no matter what the enrollment or program may be, at least two such rooms should be provided in the building, these to be specifically designed and utilized as classrooms. In large institutions, and especially those in which teacher personnel are educated, provision may well include as many as six such rooms of different sizes, with seating accommodations ranging from 40 to 150.

Lecture-demonstration Room - It is suggested that one of the classroom areas be designed primarily for lectures, demonstrations, and the use of audio-visual equipment. A room of this type is necessary where laboratory classes are combined for lectures (i.e., anatomy or physiology), where professional students gather to hear outside speakers, and where instructional movies dealing with the activities program or health education program are shown to combined classes. The seating capacity of this area should be determined by local needs, but it is recommended that a minimum of 150 seats be provided.

Although generally not recommended for classrooms, the seats in this room should be of the permanent type, arranged in rows and securely fastened to the floor. Each seat should be equipped with a tablet-arm to facilitate ease of writing. The floor should be gradually inclined or stepped upward from the front of the room to the back so that students may easily view the speaker or demonstration without the necessity of having to assume an uncomfortable sitting position. To further promote visual comfort and efficiency, a small stage or podium should be provided at the front of the room, equipped with an electrically lighted speaker's stand. It is highly desirable that storage space be provided convenient to the speaker's platform for the purpose of housing charts, models, skeletons, or other instruction materials used in conjunction with this room.

The room should be appropriately decorated and acoustically treated. A large chalkboard should be provided on the front wall directly behind the speaker's platform, and above the chalkboard area there may be a permanent or pull-down motion picture screen. A large tackboard should be provided on the front or side corridor wall near an exit. It is desirable that a wall clock be located so as to be visible from all seats.

Adequate lighting and ventilation are essential to the efficient function of the lecture-demonstration room. It is desirable that mechanical ventilation be provided and that room temperature be thermostatically controlled.

To promote effective use of audio-visual equipment, it is recommended that a projection booth be planned at the rear of the area. This should be of such height that students walking across the rear of the room will not interfere with the light beam from a projector. Adequate electrical outlets must be provided for the various audio-visual machines used in conjunction with the room. Windows should be equipped with room darkening devices.

The location of entrances is of functional importance in the planning of the lecture-demonstration room. At least one entrance should be provided at the front of the room. For the convenience of those persons who may be late in arriving at lectures or demonstrations, however, it is suggested that an additional entrance be located at the rear. This will permit late-arrivals to enter and be seated with a minimum of disturbance to the speaker or others in the room.

Class-discussion Rooms - The majority of classrooms provided in the building should be designed to comfortably seat approximately 40 students under ordinary class conditions. Seats may be of the movable tablet-arm type, or large work tables and straight-back chairs may be provided.

Special consideration should be given to the provision of adequate lighting, heating, ventilation, acoustics, storage space, and chalkboards and tackboards.

Although it is realized that classrooms of the physical education building should not follow the elaborate pattern of those in The Cathedral of Learning at The University of Pittsburgh, mention is made of these rooms as a means of illustrating how class areas can be planned to assume a pleasing distinctiveness of character. Several rooms of this unique educational building are designed and carried out in the architectural patterns of various nations. Murals and paintings on the walls depict the life and customs of the people. Classrooms of the physical education building might advantageously assume a distinctiveness appropriate to the program by the provision of murals, paintings, models or busts depicting various pioneers, sports, or specific stages in the history of American physical education.

Audio-Visual Room - A separate room in the building might be provided for the use of audio-visual equipment employed in the instructional program if other appropriately equipped areas are not available. The need for such an area in the building is also indicated by the importance placed on the use of films by athletic coaches. Football coaches are more and more utilizing pictorial scouting reports as a means of instruction and preparation for future contests.

The audio-visual classrooms should possess similar characteristics to others in the building, but, in addition, certain features peculiar to this area must be considered. Windows, if provided, must be equipped with darkening devices, and mechanical ventilation may be necessary. A projection booth may be provided at the rear of the room, and a pull down picture screen at the front. Surfaces must be acoustically treated to facilitate the most desirable sound control. It is of vital importance that electrical outlets be provided, and that these be so located as to permit the use of audio-visual equipment from any part of the room.

Ideally, the audio-visual room should be located near the lecture-demonstration area, thus permitting the ready transfer of equipment from one room to the other.

A storage room for projectors and other audio-visual equipment and materials should be located, if possible, between the audio-visual and lecture-demonstration rooms, with entrances to both areas.

Multiple Purpose Classroom - Where available building funds will not allow all the various types of classrooms suggested, it is possible to provide an area with sufficient flexibility to permit its use for a number of purposes. Two classrooms of approximately 30' x 30' could be separated by a movable partition which, when opened, provide an area 60' x 30'. Such an area would be of value for classes, lectures, audio-visual uses, demonstrations, or even college or departmental dances or parties.

Where such an area is being considered, it is particularly important that plans call for movable furniture and equipment, room darkening devices, thermostatically controlled ventilation, suitable chalkboard and tackboard space in each segment, electrical outlets at regular intervals on end and side walls thereby permitting use of audio-visual equipment from any section of the area, a pull-down screen that can be used at either end or on the wall side of the area, and entrances at each end.

A room of this type could handle two separate classes of approximately 50 persons, and, when the movable partition is opened, could handle a group of 100 or more. If the area is to be used for departmental social events, it would be well to consider the inclusion of a small kitchen and serving counter at one end.

THE MAIN GYMNASIUM

The physical education building will include one main gymnasium which should be adaptable for a number of different activities. In addition to the activities of the physical education and intercollegiate athletic program, the main gymnasium may be utilized for such functions as graduation exercises, musical concerts, dances, and banquets. The nature of this area necessitates that planning be done in terms of all the activities to be included and the needs for spectator accommodations. The provision of spectator space should not be the primary consideration, however.

The main gymnasium will be used during the regular school day for physical education instruction classes and during evening hours for intercollegiate athletic practices and contests, intramural sports participation, exhibitions, concerts, and dances. Those persons taking part in the physical education, intramural sports, and intercollegiate athletic programs will normally be dressed in cotton jerseys, trunks, and rubber soled shoes. Spectators and persons attending dances, banquets, or other functions scheduled for the gymnasium will be dressed in street clothes.

Since the main gymnasium is considered as being the focal point of the physical education program, its location should preferably be near the center of the building. It is desirable that auxiliary teaching rooms, special activity areas, and service facilities be planned around the main gymnasium and convenient to it.

The shape and dimensions of this area are of extreme importance to the efficient functioning of the program. The criteria for determining floor size are:[1] (1) the character of the total physical education program, (2) student load as determined by enrollment and attendance requirements per week, (3) spectator interest, and (4) anticipated growth of enrollment and program.

The scope and needs of the total program should be carefully studied before committing architects to definite standards of size. Careful consideration should be given the activities to be included on the floor and the number of activity areas (i.e., basketball courts, volleyball courts, badminton courts, and others) desired for physical education class participation and intramural play. Where administrative policy specifies a definite number of students as being desirable for each class, provision should be made for sufficient activity areas to accommodate all class members under game conditions. For example, if administrative policy stipulates 40 students in each class, the following space provisions would be ideal: at least 3 cross-court basketball areas, 3 volleyball courts, and 9 badminton courts. The dimensions of the main gymnasium floor can only be determined by the desired activity space requirements. The official playing rules of the various sports must be studied before a completely satisfactory gymnasium is possible.

Figure 2 illustrates the dimensions suggested to accommodate an intercollegiate basketball court with safety zones and spectator provisions.

Although functional planning proceeds according to the official space requirements of activities to be included on the main gymnasium floor, several other factors are equally important to the optimum utility of this area. To allow the most desirable conditions for play, and to reduce accidents resulting from poor planning, a reasonable safety zone should be included around certain activity areas. Table 2 presents the official court dimensions of activities which may be included in the physical education building. Suggested space provision for each activity is included.

A great deal of thought should be given the problem of courts to be laid out on the gymnasium floor. Maximum flexibility of the gymnasium depends upon how well the planning group is able to provide for the many problems of a multi-purpose area. It is desirable that badminton and volleyball courts be so laid out that side backboards do not have to be constantly raised and lowered. It is further recommended that painted lines on the floor for basketball, volleyball and badminton be of contrasting colors so as not to present a confusing pattern to participants in the various sports.

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[1] The College Physical Education Association, _op. cit._, p. 32.

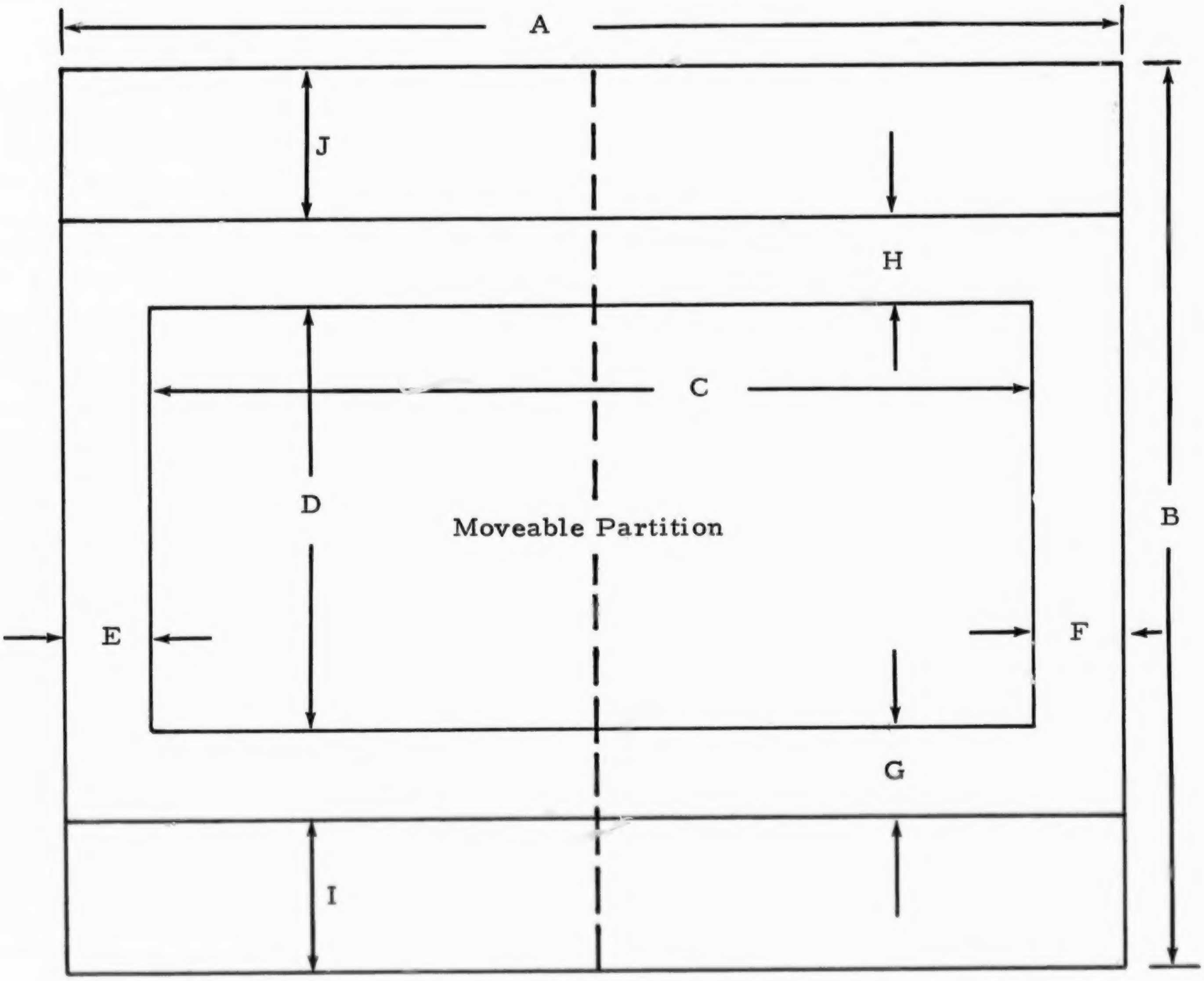

FIGURE 2. Recommended Floor Area for a Two-Court Gymnasium

A and B: Overall dimensions of floor 124' x 106'
C and D: Basketball court dimensions: Intercollegiate court 94' x 50'
Cross courts 74' x 42'
E and F: Safety zones: 10' at ends, 6' at sides of intercollegiate court
G and H: Safety zones: 10' at ends, 10' at outer sides, and 22' between cross courts
I and J: Area devoted to folding bleachers will depend upon desired seating capacity

TABLE 2
SUGGESTED TEACHING STATION SPACE PROVISIONS

Activity	Official Dimensions	Required Additional Space	Recommended Additional Space	Recommended Ceiling Height
Archery	30-100 yds. At least 30 yds. indoors. Targets 3-5 yds. apart.		15' behind firing line.	15'
Badminton	20' x 44' (doubles) 17' x 44' (singles)		6' at sides and at ends.	25'
Basketball	42' x 74' (minimum) 50' x 94' (maximum) Backboards 4' from end lines.	3' on all sides, 10' where possible.	6' - 10' at sides, 10' at ends.	25'
Bowling (Ten-pins)	62', 10-1/8" from foul line to edge of pit. Width: not less than 41" nor more than 42" (60" including gutters). Over-all alley dimensions: Length-standard, but not specified, 83'. Width: one alley, 6', 2-1/2"; two alleys, 11', 5-1/4"; four alleys, 22', 7-3/4".	Approach: minimum of 15' behind foul line. Pit: minimum of 30" from alley to rear cushion.	Behind approach: Space for spectators; bowlers' setees; aisle behind spectators' seats. Behind pit: aisle for pin setters; storage space for equipment; side or center aisles for pin-boy traffic.	8' - 12'
Bowling (Duck-pins)	Same as above except gutters not less than 8-1/2" each (width).			
Boxing	18' x 18' inside ropes.	Floor of ring should extend 2' beyond lower ropes.	Space for class instruction, heavy and light striking bags.	12' minimum where raised platforms are provided.

TABLE 2 (Continued)

Activity	Official Dimensions	Required Additional Space	Recommended Additional Space	Recommended Ceiling Height
Fencing	Between 5', 10-7/8" and 6', 6-3/4" wide and 40' long.		Provision for three standard fencing lanes plus additional space for instructional purposes.	12'
Handball (Four-wall)	A. A. U. - Length: 46', Width: 23', Ceiling: 23', Back Wall: 12'. If a gallery, at least 10'.			20' minimum.
Handball (Four-wall) Y. M. C. A.	20' x 20' x 40' to 44'.			20'
Handball (One-wall)	A. A. U. - 20' wide x 34' long x 16' high.	At least 6' of clear space beyond side and behind rear boundary lines.	At least 10' on both sides and end.	16'
Riflery	50' from firing points to targets, 4' 6" minimum distance between firing points.		Approximately 6' to 10' behind targets to accommodate backstops, and not less than 20' behind firing line to accommodate shooters. Sufficient width to permit at least 5 firing points.	8'
Shuffleboard	6' x 52'		At least 2' at sides and 6' at ends.	8'
Squash Racquets	A. A. U. - 18', 6" wide x 32" long x 16' high (singles). 25' wide x 45' long x 20' high (doubles).			16'

TABLE 2 (Continued)

Activity	Official Dimensions	Required Additional Space	Recommended Additional Space	Recommended Ceiling Height
Tennis (Deck)	12' x 40' (singles) 18' x 40' (doubles)		At least 4' at sides and 5' at ends.	10'
Tennis (Lawn)	27' x 78' (singles) 36' x 78' (doubles)	None except for international matches.	At least 12' at sides and 21' at ends.	25'
Tennis (Paddle)	16' x 44' (singles) 20' x 44' (doubles)		At least 6' at sides and 8' at ends.	20'
Tennis (Table)	Table: 5' x 9' x 2', 6" high.		At least 4' at sides and 8' at ends.	8'
Volleyball	A. A. U. 40' x 70' maximum U. S. V. B. A. 30' x 60' Ideal 30' x 60'	A. A. U. requires minumum of 3' on all sides; and at least 15' ceiling height, free from all obstructions.	At least 6' between sidelines of adjacent courts. At least 10' at end of courts.	25'
Wrestling	24' x 24'	5' supplementary mats around mat proper.	Space for exercise and class instruction.	8' minimum

The varsity court may be laid out lengthwise in the center of the area, thereby providing the maximum amount of temporary bleacher space. Care must be taken in the original plans to make certain that at least 5 or 6 feet of free space is provided at the sides of the court, and at least 10 feet at each end.

For intercollegiate basketball contests, backboards should be of the type which can be lowered from the ceiling, folded against the wall, or mounted on roll-away standards. The former type are most commonly provided, but in certain instances may not be practical if the ceiling height is too great or if overhead trusses do not provide a suitable means of support or are not properly located. Where roll-away standards are provided, it will be necessary to include sufficient storage space adjacent to the playing floor. Backboards at the ends of basketball cross-courts should be either of the type which lower from the ceiling, or if a wall is adjacent to the end of the court, the type which can be collapsed against the wall surface.

If sufficient space is available at ends of courts, it is recommended that backboards be of the type which can be raised backwards away from the court or folded against a wall, thereby eliminating an overhead obstacle on the badminton and volleyball courts. By all means, the type of backboard which is raised to the ceiling should be equipped with individual key-operated electric motor winches. Where backboards must be raised and lowered constantly for various activities, it proves a tedious and extremely exasperating task to raise and lower several backboards by means of a hand-operated crank. Backboards should not interfere with spectator vision or become an obstruction when temporary bleachers are in use. It is important that the exact layout of basketball cross-courts, and the accompanying location of backboards, are specified in the original building plans. Failure to follow this procedure of planning has forced many institutions to either remove or repaint floor markings or remove and relocate the backboards.

The ceiling height of the main gymnasium should be such that normal basketball, volleyball and badminton play is possible. The recommended minimum height for colleges is 25 feet. A height of less than 25 feet will prove inadequate for normal play, and considerable height above this recommended standard will result in greatly increased construction costs. The desired ceiling height in all areas of the physical education building should be governed primarily by the activities that will be conducted in the specified area.

The provision of permanent spectator galleries may be a necessary planning consideration where considerable spectator interest is demonstrated. The demands for permanent seating should be limited to the extent that valuable activity space is not sacrificed, however. The gymnasium should never be planned in terms of seating capacity rather than student participation. In order to provide the maximum activity space for physical education and intramural sports programs and, at the same time, insure adequate spectator accommodations, it is desirable that building plans call for the installation of folding or telescopic bleachers. The demand for spectator seating should be determined by present and expected future student enrollment, the population of the community, and the popularity of certain indoor sports at the local institution. A detailed description of the various types of bleachers, and the factors to be considered in their installation, is presented in Chapter V.

If the main gymnasium floor is to be utilized for such activities as volleyball, badminton, deck tennis, indoor tennis, and gymnastics, provision should be made in the original floor plan to include floor plates for the securing of standards and equipment necessary in the playing of these activities. This is extremely important as the floor must be reinforced where considerable strain will be exerted from high bars and other

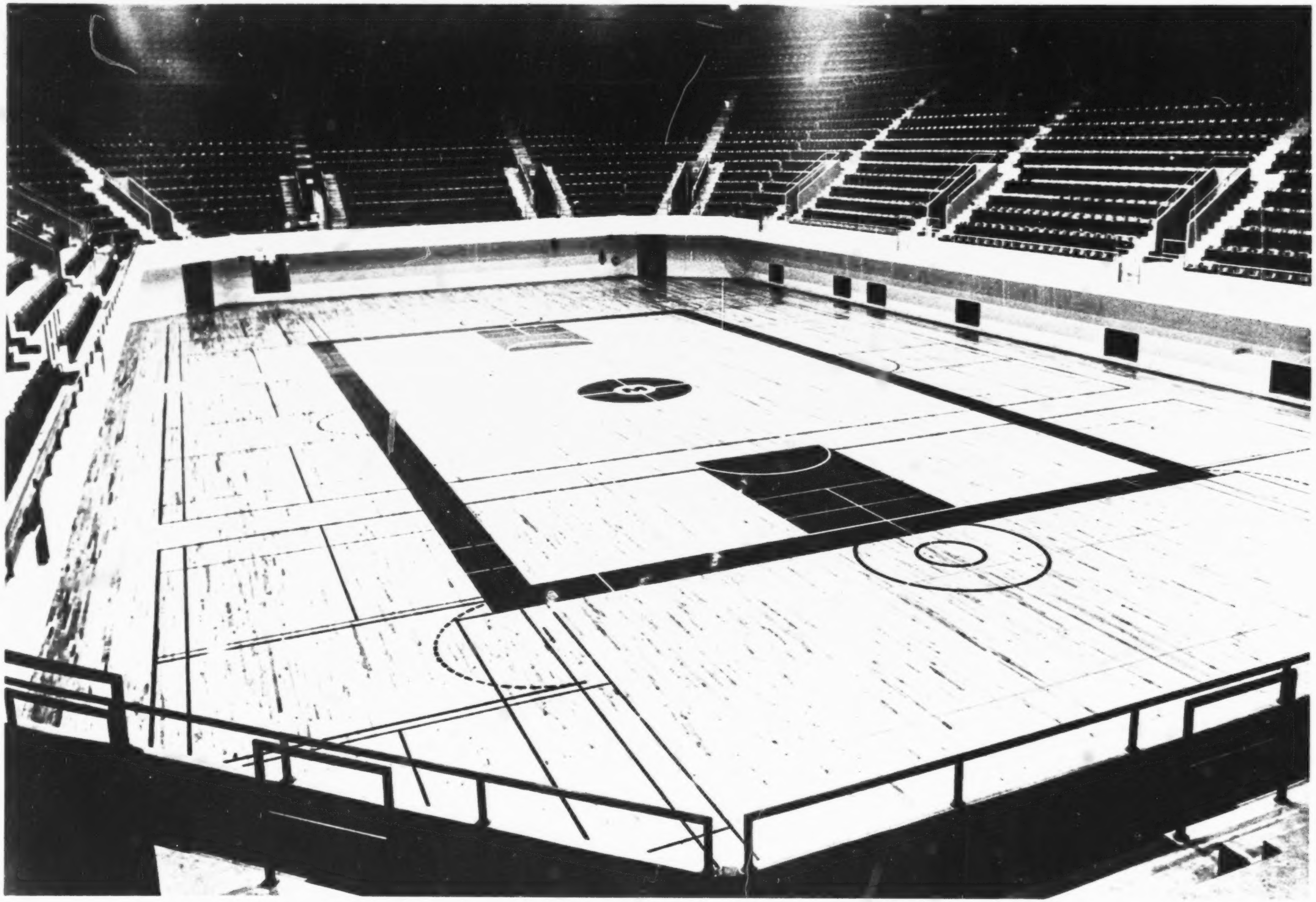

PLATE 1. Main Gymnasium, Southern Methodist University, Dallas, Texas. Courtesy of the Hillyard Chemical Company. Floor provides three cross-court basketball courts as well as space for bandminton and volleyball. Badminton courts are planned at sides of center basketball courts, thereby freeing this area from the confusion of lines for intercollegiate play. Note how extra lines are eliminated by combining the badminton and cross-court basketball boundary lines.

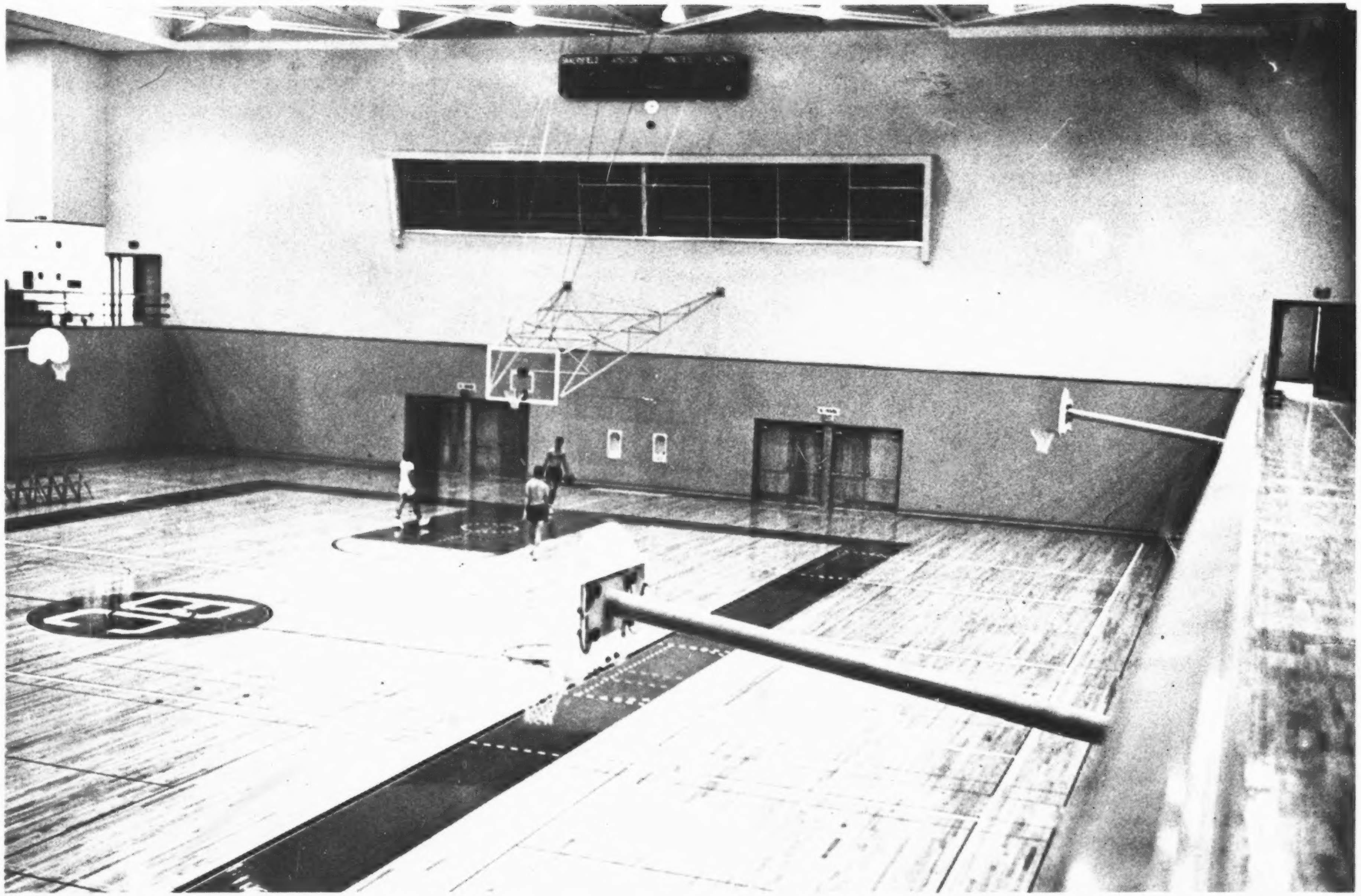

PLATE 2. Main Gymnasium Floor, Bakersfield College, Bakersfield, California. Courtesy of Bakersfield College. Gymnasium features 10 badminton courts, 3 volleyball courts and 3 cross-court basketball courts on the 135' x 106' main playing floor. Balconies provide a regulation basketball court, 4 badminton courts and 2 volleyball courts on either side when rollaway bleachers are in closed position against walls. Press box at end of floor provides complete facilities for press and radio broadcasting. Large electric scoreboards are located high on either end wall. Recessed drinking fountains and self-flushing cuspidors, with tile floor and drain underneath, are located to the rear of backboards on both end walls.

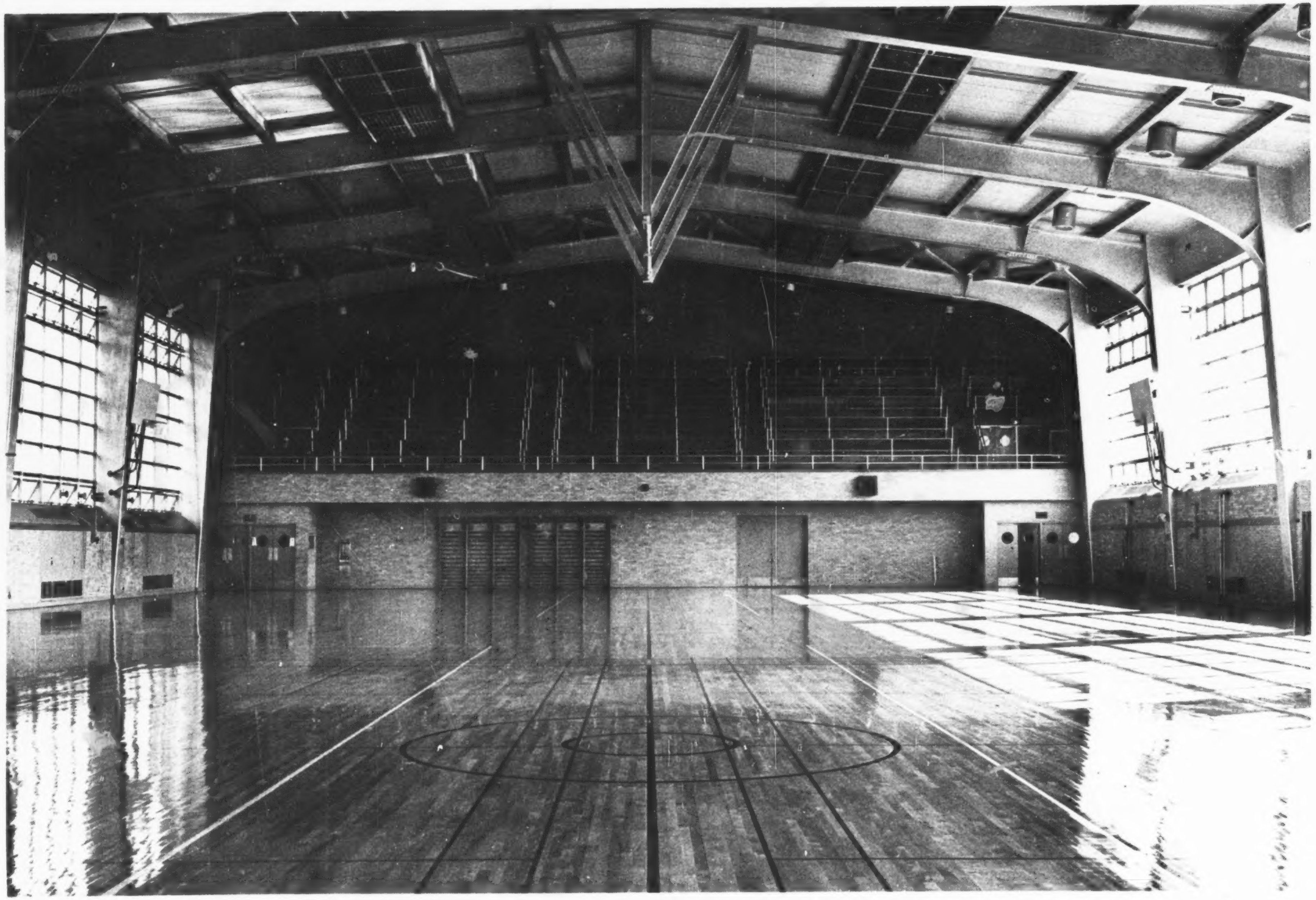

PLATE 3. Main Floor, Archbold Gymnasium, Syracuse University, Syracuse, New York. Courtesy of John H. Shaw, Director, Syracuse University. Floor area 180' x 114' provides 3 regulation basketball courts, 8 badminton courts and 4 volleyball courts. Suspended gymnastics apparatus is located above court at one end of floor. Ceiling over intercollegiate basketball court is free of obstructions. Spectator balcony enables small crowd to be handled without using floor bleachers. Heating and ventilating units and overhead lights are recessed and covered with metal protectors. Basketball backboards fold against side walls.

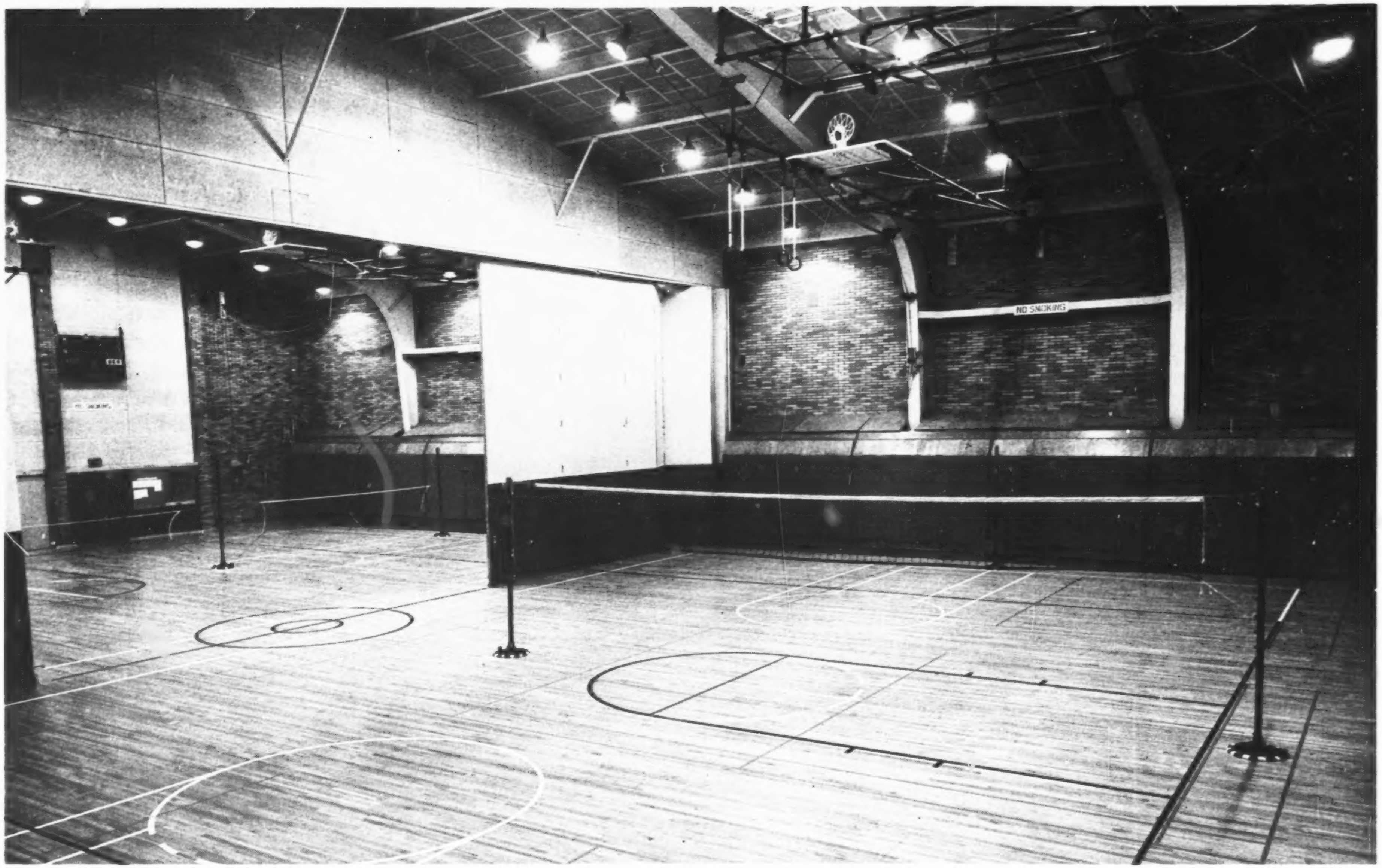

PLATE 4. Main Gymnasium, Physical Education Building, University of California, Riverside, California. Gymnasium prepared for simultaneous classes in badminton and volleyball. Motor operated partition provides soundproof isolation of both areas. When inclement weather forces tennis classes indoors, the heavy partition provides an excellent flush rebounding surface for practice of tennis strokes. A 2" strip of white masking tape is run along the length of the partition at a height of 3' for the purpose of simulating the top of a tennis net. The lower portion of the partition is covered with a tough plastic material (Kalistron) which will not scuff and is easily cleaned.

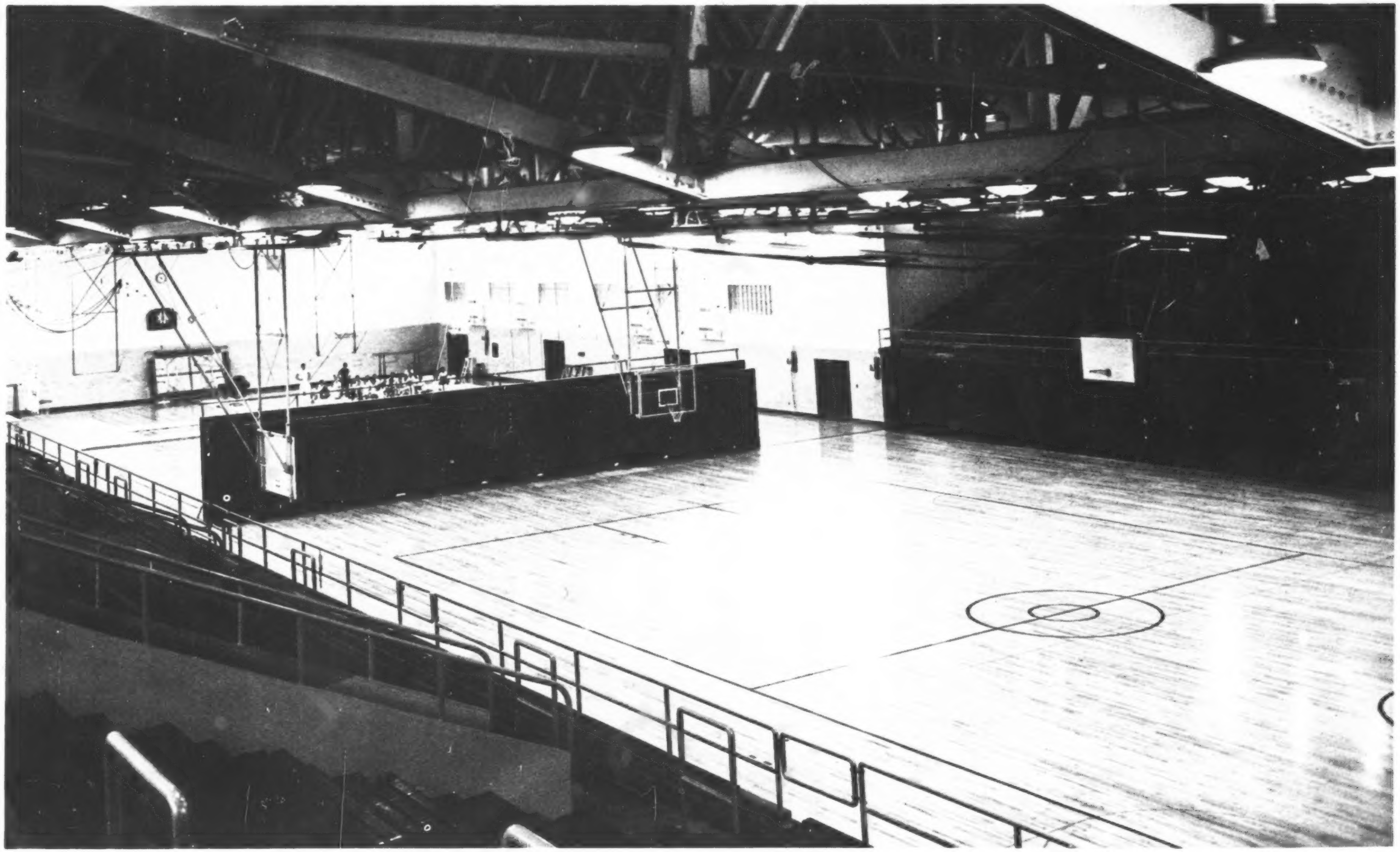

PLATE 5. Main Playing Floor, Men's Gymnasium, University of Florida, Gainseville, Florida. Courtesy of University of Florida. This spacious floor (270' x 106') provides 4 cross-court basketball courts as well as ample area for gymnastics, badminton, volleyball and many other indoor activities. Gymnastic apparatus is shown in position for class use. Storage rooms at side of floor easily accommodate mats, bars and trampolines. A unique feature is the mobile folding bleacher unit shown in the middle of the floor. This unit, mounted on rubber wheels, is rolled into the gymnasium for intercollegiate basketball contests. Approximately 6, 500 spectators can be accommodated in permanent balconies plus telescopic or rollaway bleacher units which recess into walls.

apparatus of this type. Floor plates must also be included where certain types of telescopic bleachers are to be installed. These should be recessed and flush with the floor, and should not present a safety hazard to participants or an obstruction which prevents the true bounce of a ball.

In order to increase the flexibility of the main gymnasium, many schools have provided motor-driven folding or sliding partitions which divide the playing floor and increase the nimber of teaching stations. A provision of this nature is quite satisfactory where separate areas are not included in the building for volleyball, badminton, gymnastics, and other activities, or where both sexes use the floor during the same class periods.

Obstructions - The modern gymnasium should not be cluttered with suspended apparatus, chest weights, horizontal ladders, and other such equipment common to the traditional area of many decades ago. The walls and ceilings should be kept free of all devices which mar the attractiveness or reduce the utility of the gymnasium. If a separate room is not provided for tumbling and gymnastics, such equipment should be located at an end of the floor area which is not utilized for intercollegiate basketball games, and all suspended apparatus should be of the type that can be raised to ceiling height when not in use.

Storage Room - At least one storage room should be planned in connection with, and located adjacent to, the main gymnasium. This room should be of sufficient size to handle all types of equipment used in the area such as temporary bleachers, roll-away basketball standards, turnstiles, folding chairs, badminton and volleyball standards, and all heavy and light apparatus used in tumbling and gymnastics if a separate gymnasium and storage room is not provided for gymnastics elsewhere in the building. It may be desirable to plan a storage room at each end of the floor, one for handling apparatus and sports equipment and the other for housing portable bleachers, chairs, speakers' platforms and maintenance equipment. At those institutions where the tumbling and gymnastics area is to be included as a part of the main gymnasium, it is advisable to locate a storage room near that part of the floor utilized for daily class activities and intercollegiate competition.

It is not possible to stipulate storage room dimensions that would be suitable for all situations. To prove adequate for handling the equipment and apparatus most commonly used in college gymnasiums, however, it is suggested that storage rooms be at least 40' x 15' with sliding doors approximately 8' high x 20' long. Ceiling height should be such as to permit overhead room for all items to be stored in the area. Overhead light fixtures should be recessed in the ceiling to prevent their being broken by volleyball standards or other long pieces of equipment. Storage shelves are suggested for both ends of the room, these running to the ceiling and fitted with shelves of the adjustable type. There should be no raised threshold under the door to impede the rolling of apparatus and equipment to or from the room.

Since there are numerous occasions when the activities of the main gymnasium require the use of piano, phonograph, and amplifier, it is recommended that a separate storage room area be provided for the equipment. It is preferable that this apace be recessed in a wall convenient to the station where the instructor will stand, or where the orchestra will be located at times when dances are held in the gymnasium. The size of this storage space need be only of such dimensions as to accommodate the above mentioned equipment. Electrical outlets should be provided convenient to the place where equipment will be used.

CHAPTER IV

AUXILIARY GYMNASIUMS AND SPECIAL ACTIVITY AREAS

Physical education administrators are in general agreement that the college physical education program should include the following types of activities: (1) gymnastics and tumbling; (2) individual, dual, and team sports; (3) aquatics; (4) dance; and (5) prescribed special exercises.

A program of this scope and diversity would not be possible where only a main gymnasium floor is provided in the building. Additional activity areas will be required, these being referred to as auxiliary gymnasiums or teaching rooms and special activity areas.

Auxiliary Gymnasiums

Tumbling and Apparatus Gymnasium

A separate area in the building is desirable for the permanent installation and storage of gymnastic apparatus. Considerable confusion occurs where gymnastic apparatus and equipment must be set up on the main gymnasium floor during instructional periods, and where other activities are being conducted on the floor at the same time. In many instances, an intramural and intercollegiate gymnastics program is not possible due to the floor being used during late afternoon and evening hours for other activities.

The tumbling and gymnastics gymnasium will be utilized mainly during instructional periods and in the late afternoon. Those persons using the area will be dressed in physical education costumes and will be wearing rubber or soft kid soled shoes.

This area should, ideally, be located adjacent to the main gymnasium and convenient to dressing and shower facilities. By all means, it should be so placed that heavy apparatus can be easily moved into the area from outside the building. A third floor location, for example, would present an extremely difficult problem where a service elevator was not provided.

The dimensions of the tumbling and apparatus gymnasium should be determined by the space requirements necessary to accommodate the apparatus and equipment installed, and by the space needs for efficient performance in the activities prescribed for intercollegiate competition. Ceiling height will be governed by the official rules pertaining to flying rings and climbing ropes. The safety of performers and spectators should be a major consideration in the planning of apparatus installation. Each piece of apparatus should be so located that performers do not interfere with other activities in the area. The location of flying rings, for example, should be such that free space is provided through the entire range of swing, and at least 15 feet is allowed at either end of the swinging arc. Walls, windows, or other apparatus should not interfere with the dismount. Horizontal bars should be installed in such a location that it is possible to lay safety mats completely around the area of performance.

If intercollegiate gymnastic meets are to be held in this gymnasium, it will be necessary to provide additional space for spectator accommodations. Spectator seating should be in the form of portable or folding bleachers. It is not recommended that permanent seating areas be planned. Folding bleachers, if provided, should be recessed and flush with the wall surface when this is practicable, and preferably located on the outer wall beneath window areas. Since gymnastic meets are usually held in the afternoon, spectators should not be forced to look into the light from outside.

The gymnastic area in the typical college or university physical education building includes such apparatus and equipment as mats, mat dollies, parallel bars, side horses, horizontal bars, bucks, spring boards, trampoline, climbing ropes, flying rings, traveling rings, and horizontal ladders. In order to accommodate certain pieces of apparatus, it will be necessary to provide special attachments in the floor, walls, and ceiling. Floor plates for attaching equipment should be recessed and flush with the floor. It is extremely important that original plans include the exact layout of apparatus, as it will be necessary to reinforce the floor where apparatus is to attach. Where apparatus is to be attached to a wall, it is advisable to provide a wall apparatus board.[1] This board should be 8 inches wide by 1 1/2 inches in thickness, and should be bolted to the wall on 2 foot 6 inch centers and the bolt-heads countersunk. The height from the floor to the center of the board should be at least five feet. It is desirable that apparatus be bolted through the wall rather than merely attached, and it is important that such fastenings be placed in the wall prior to the time the finish surface is applied. Apparatus suspended from the ceiling should be securely attached to steel beams. The action of the suspended apparatus, when in motion, should be that of metal against metal rather than metal against wood.

A minimum standard of 20 foot-candles of natural light is desirable in the tumbling and apparatus gymnasium since, as previously stated, the area will be utilized primarily during daylight hours. Ceiling height windows, starting approximately 8 feet from the floor, should extend the entire length of at least one wall, and additional light may be obtained through the use of directional glass blocks in one or both end walls, and/or the ceiling. It is advisable that direct rays of the sun do not shine in the eyes of persons using the area. Venetian blinds may be desirable on all windows.

There will be need for unusually wide openings between the main gymnasium and the tumbling and gymnastics area, since heavy apparatus and equipment will be occasionally moved from one room to the other. The height and width of openings and doors should be determined by the largest apparatus to be included. Sliding or garage type doors are suggested as being more desirable than the hinged type which swing open into the activity area. A suddenly opened swinging door might well result in a serious accident. Doors which open into the tumbling and apparatus gymnasium may also interfere with the placing of apparatus and equipment at desirable locations on the floor. There should be no sill or other obstruction in the doorway to impede the moving of rolling apparatus from one area to the other.

Apparatus Storage Room - Failure to provide adequate and convenient storage space for equipment used in the tumbling and apparatus gymnasium has been one of the major planning mistakes noted in physical education buildings throughout the country. This oversight or neglect on the part of responsible persons leads to the existence of several administrative problems. Where such a storage area is not provided, a tendency occurs to store mats by simply stacking them one on top of another in a convenient corner of the room. This practice results in unnecessary wear and tear on the mats, as well as creating a health hazard. Students will invariable walk over the mats in their street shoes, utilize the pile as a sitting place, or drag the mats across the floor for any number of reasons. Even when hung on the wall, mats serve to reduce the attractiveness and utility of the area.

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[1] The College Physical Education Association, *op. cit.*, p. 37.

The practice of leaving standing apparatus and equipment in the room after physical education activities creates a problem of effective supervision. Students passing by the area may be attracted to the apparatus and attempt to demonstrate their skill in certain stunts, with little or no regard for correct technique or safety precautions. Unnecessary accidents occur each year where supervision and safety measures are not provided. Accidents will also occur where apparatus is left in the area when utilized for other activities of the program. The hazard of collision should be reduced by removal of all pieces of apparatus from the floor to an adjacent storage room. The principle of multiple use of facilities implies that it should be possible to easily remove and store all apparatus and equipment when not in use, thereby providing a clear floor area for other activities.

It is suggested that mat dollies be provided for the storage and transportation of mats. The practice of hanging mats on wall hooks in the storage room oftentimes necessitates moving various pieces of apparatus in order to remove or place mats on the hooks. There is also a tendency on the part of students to drag mats across the floor to the storage room rather than to lift them.

Dance Studio

Courses in various types of dancing have become increasingly popular in college physical education programs. In view of this fact, it is recommended that a separate room be included in the building, designed primarily for this purpose. The provision of such a room is particularly desirable where the building is to be used for instructional purposes by both sexes, or where co-physical education classes are to be scheduled in this building. The room may also serve such college functions as dances, recitals, receptions and parties.

Persons using this area may be dressed in either street clothes or physical education costumes, and may be wearing leather, rubber soled, or soft kid soled shoes, or they may be in bare feet. The nature and purpose of the room suggest that a smooth hard maple floor, with good resiliency, is the ideal choice.

Since the area will be used mostly during daylight hours, the location should be such that a maximum amount of natural lighting is assured. Location of the room in a corner of the building, or in a separate wing, increases the lighting possibilities by permitting windows on more than one side. Directional glass blocks may be used in some cases to eliminate direct rays of the sun. The University of California at Riverside provides an extremely attractive and functional arrangement through the provision of plate glass sliding doors which extend the entire length of the outside wall. The sliding glass doors offer exit to a patio where refreshments are served when the room is used for campus social activities and, also, provides a beautiful view of orange groves and distant mountains. An overhanging roof prevents rays from the sun falling directly on the floor and serves as weather protection in case rain should fall when the outside refreshment serving counter is used for social affairs.

Overhead lighting should be planned for use on overcast days and when the room is used for campus activities during evening hours. Recessed fluorescent lighting is recommended, and the provision of various colored filters permits many lighting combinations for dance exhibitions and campus social affairs. It would be well to plan the installation of various colored floodlights over the area of the room which will be used for dance exhibitions, thereby permitting ideal lighting of the performance area while at the same time darkening the rest of the room. Stage curtains or a modernfold door may be included to separate the performance area from the spectator section. Light switches for floodlights should be located on a wall in the "behind scenes" section. An ideal backdrop for dance performances may be provided by means of drapes, mounted on traverse rods, which run across an entire end or side wall of the room.

Wood panelling of one or more walls may be particularly effective in the dance room as a means of promoting an attractive, functional facility. For instructional purposes and to create the illusion of additional room space, it is desirable to provide recessed full length mirrors along at least one wall.

Storage space must be provided for piano, phonograph, record cabinet, rhythm instrument rack and other equipment used in the room. The dimensions of the storage area should be determined by the equipment to be accommodated.

The dimensions of the dance studio should be determined by the expected peak enrollment in any one dance section, and by consideration of the total use of the area for campus activities. It is suggested that an area approximately 75' x 60' would be ideal for dance sections not exceeding 40 students. This amount of space would also be adequate for small social gatherings such as receptions, recitals, dances, and parties. If the room is to be used for campus social activities, it may be desirable to provide a kitchenette and serving counter adjacent or convenient to the dance studio. Ceiling height need be no greater than for ordinary classroom purposes.

Corrective Exercise Gymnasium

The modern program of physical education offers opportunities for instruction in various sports activities to virtually all students on the campus, regardless of their physical condition. No longer are blanket excuses granted to every student who possesses a physical handicap. Insofar as possible, the handicapped student is enrolled in an adapted or modified program in which he may participate in certain prescribed activities. Such activities as golf, swimming, archery, bowling, and gymnastics may provide opportunity for the handicapped person to participate on an equal basis with so-called normal students.

Despite the attempts to include all students in the regular or adapted physical education instruction program, there are usually several students enrolled in the college who are not physically able to participate in the sports program. Modern educational philosophy dictates that special opportunities, instruction, facilities, and equipment be provided for these individuals. When based upon medical diagnosis and recommendation, and when under competent supervision, the physical education program may offer both recreational and therapeutic benefits to the more seriously handicapped individual. In view of this fact, the physical education building should include an area devoted to the facilities and equipment needed to provide recreation and corrective treatment for students found by the health examination to possess certain structural or functional defects. This area is referred to as the corrective exercise or special exercise gymnasium.

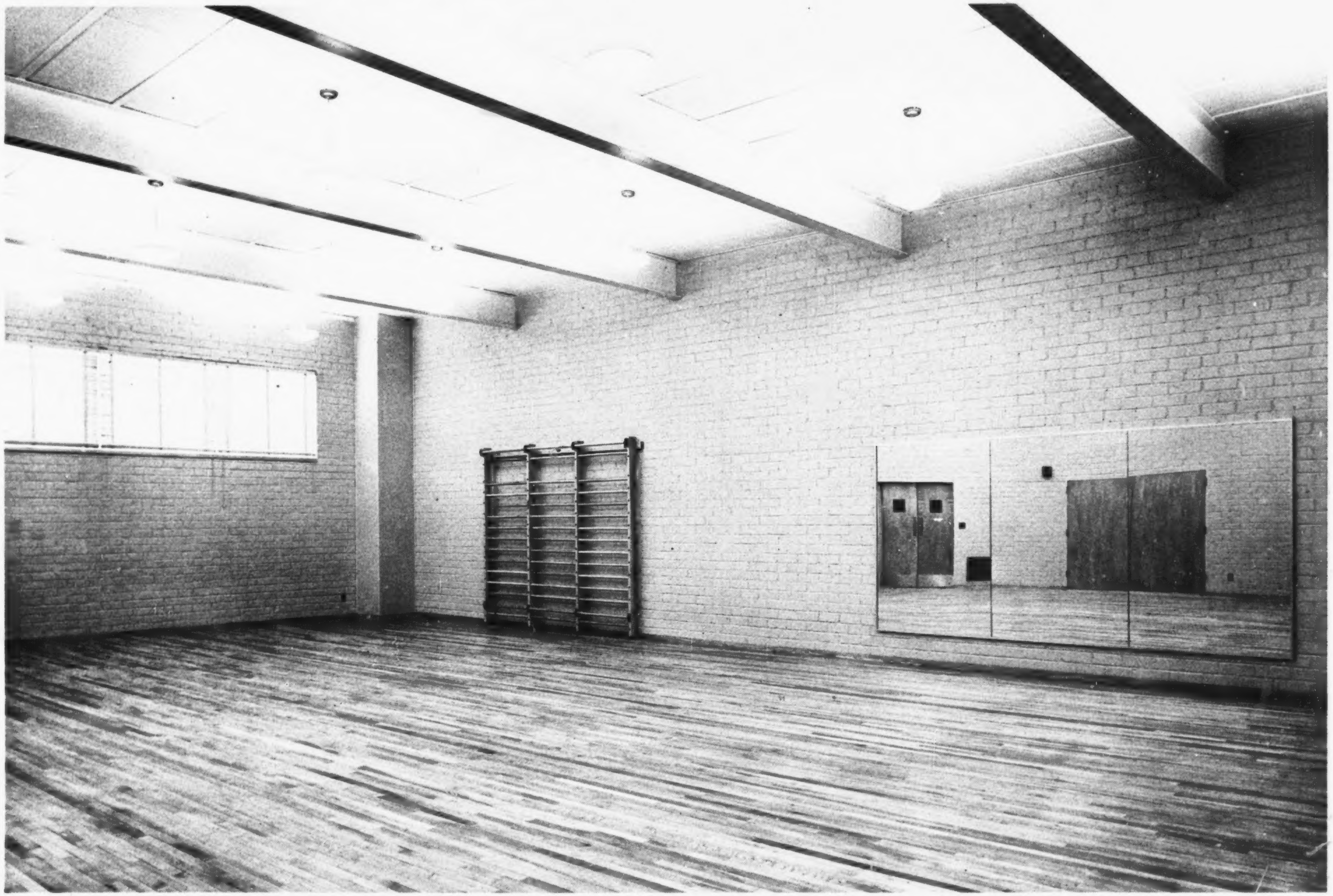

PLATE 6. Multi-purpose Activity Room, Physical Education Building, University of California, Riverside, California. This room provides a free area 60' x 40' which may be used for corrective-exercise classes, fencing, dancing and, on occasion, for indoor golf and tennis instruction. Doors leading to locker rooms and to a large storage room are reflected in mirror.

The nature of this gymnasium suggests that its location be on the ground level and adjacent to dressing and shower facilities. If the health service is included in the building, the corrective exercise gymnasium should be convenient to this area. Since the area will be primarily utilized by handicapped students, an effort should be made in the planning process to eliminate unnecessary stair climbing.

The size of the gymnasium should be determined at each institution by student enrollment, a study of health service records to learn the average number and types of handicapped students in attendance over a period of years, and the space requirements for the optimum program and equipment. Loebs[1] states that dimensions of the floor area should be determined by the following factors: (1) the scope of the required corrective program; (2) size of the classes; (3) number of periods of instruction required per week; (4) scope of the optional corrective program; (5) present and predicted future enrollment; (6) use of the room by both sexes; (7) public usage of the facilities; and (8) the amount of equipment and apparatus to be installed. Evenden, Strayer, and Engelhardt[2] recommend that the dimensions of the area should be at least 25 feet by 50 feet, but that the number and size of corrective rooms should be determined by allowing 50 square feet per student requiring treatment, with regard to the number of treatments per week.

In addition to the above recommendations, consideration of desirable room size should be based upon the possibilities for multiple use of the area. Dimensions may be partially dependent upon the official rules of activities included in the program, such as volleyball, badminton, shuffleboard, deck tennis, and rope climbing.

The corrective exercise gymnasium should provide optimum visual efficiency and a pleasant and cheerful environment. These are important factors in the successful conduct of the program. If possible, windows should be located so as to avoid sun glare during afternoon periods. Windows should be at least 8 feet above floor level in order to utilize the wall surfaces for apparatus, appliances, and for activities.

The structure and type of equipment to be installed in the corrective exercise gymnasium should be considered before the actual construction of the walls takes place, so that necessary wall and ceiling appliances can be located in the fundamental structure. Balance beams, climbing ropes, chest weights, stall bars, mat hangers, horizontal bars, mirrors, and other specialized equipment adapted to this particular type of program should be located in the early working drawings of the architect and approved by the persons who are to utilize both the space and the equipment for their teaching.

In order to increase the multiple use of the corrective exercise gymnasium, it is suggested that all pieces of apparatus and eauipment which are to be bolted to the floor, such as rowing machines and stationary bicycles, be located in a recessed area where they will not interfere with the conduct of activities requiring free floor area. It is recommended that a storage room be provided adjacent to the area to be served for the storing of all movable equipment and apparatus used in connection with this room.

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[1] G. F. Loebs, "Planning and Equipping the Corrective-Exercise Gymnasium for the Modern College or University," American School and University, 14th ed., New York, American School Publishing Corporation, 1942-43, p. 224.

[2] E. S. Evenden, G. D. Strayer, and N. L. Engelhardt, Standards for College Buildings, New York, Teachers College, Columbia University, 1938, p. 169.

Combatives Room (Boxing, wrestling and fencing.)

There exists at the present time a great deal of controversy among college authorities as to whether or not combative activities should be included in the physical education, intramural, and intercollegiate programs. Many institutions of higher learning do not include these activities in their program, nor do they intend to offer them in the future. The argument presented is that combative activities, particularly boxing, are of a hazardous nature and have no place in an educational program.

If the institution sponsors combative activities on an instructional or competitive basis, the amount and type of equipment necessary for a desirable situation (i. e., boxing rings, wrestling mats, heavy bags, striking bags, and standards for striking bags) suggest that a separate area be planned for these activities in the physical education building. The use of the main gymnasium is not recommended for the purpose, except for exhibition bouts and matches or intercollegiate competition.

Ideally, the combatives room should be located adjacent to the main gymnasium and on the same floor level. Such a location will facilitate the moving of heavy equipment to the main playing floor as needed, and the moving of the same equipment to the combatives area from outside the building.

In the interests of reducing confusion and promoting more satisfactory instructional conditions, it is suggested that the room be separated into three distinct areas by means of permanent or electrically operated movable partitions. The dimensions of each area should be determined by the official intercollegiate rules pertaining to boxing, wrestling, and fencing.

The boxing area should be large enought to provide space for one or more 20 x 20 foot rings, plus additional space for such equipment as heavy and light bags, pulleys, and exercise mats. Space should also be included for instructional purposes to handle the average number of students enrolled in a boxing class. The room should be free from obstructions and should be well lighted and ventilated. The heavy bags should be attached with a short, strong chain to prevent excessive swing. All mats and pulleys should be out of the way and not where they will interfere with boxers.[1]

It is suggested that a separate, sound-proofed room be provided adjacent to the boxing area for the installation of striking bags. Considerable disturbance to other activities has been noted in instances where striking bag standards are located in teaching rooms.

Space provision for wrestling should be sufficient to handle two standard wrestling mats. The area of these mats shall not be less than 24 x 24 feet.[2] Supplementary safety mats, 5 feet in width, should extend entirely around the standard mats.

The fencing room should be of sufficient dimensions to provide at least three standard lanes. The lanes on which intercollegiate bouts take place shall be between

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[1] E. L. Haislet, Boxing, New York, A. S. Barnes and Company, 1940, p. 110.

[2] National Collegiate Athletic Association, The Official Wrestling Guide, New York, A. S. Barnes and Company, 1957, p. 49.

5 feet 10 7/8 inches and 6 feet 6 3/4 inches wide and 40 feet in length. Three parallel lines shall be drawn across the strip; one in exact center, the other two at a point 10 feet from the ends.[1]

The walls of both the boxing and wrestling rooms should be free of obstructions to a height of at least six feet, and should be covered to this height with protective mats or pads. Windows should, of course, be above this height. The wall mats should be of the removable type, thereby making it possible to have them cleaned at regular intervals.

Although some authorities have recommended that the boxing room floor be covered with a one-inch felt pad, over which is stretched a canvas cover, it is believed by some that such a procedure is not only unnecessary but unsatisfactory. For ordinary instructional purposes, the entire floor area of the room may be of wood. If intercollegiate and intramural competition is provided in boxing, one or more portable rings should be erected. The wrestling room floor may also be of wood.

The National Collegiate Athletic Association lists the following regulations for construction of boxing rings:[2]

1. The boxing ring shall not be less than 18 feet square inside the ropes.

2. The floor of the ring should extend beyond the lower ropes for a distance of not less than 2 feet.

3. The floor of the ring is to be covered with a 2-inch pad, which is to extend 6 inches over the edge of the ring platform.

4. The canvas cover over the pad should extend 2 inches from the edge of the platform.

5. The corner posts are to be padded with a 2-inch covering.

6. The ropes are to be 2 feet in from the edge of the platform.

7. Heavy pads are to cover each turnbuckle.

8. Ropes are to be covered. The first rope is to be 24 inches from the floor; the second rope 36 inches; and the third rope 48 inches.

Ceiling height is of no great functional importance in the combatives area. Height over that for ordinary class room purposes is a consideration only when plans include raised boxing platforms and rings. A ceiling height of 10 - 12 feet should be adequate in most situations.

It is important that recessed drinking fountains and cuspidors be provided in the boxing and wrestling rooms. Participants in these activities will constantly have the urge to expectorate, and a real health problem exists where boxers or wrestlers expectorate on the mats or in a convenient corner. The cuspidors should be of the self-flushing type, and should be located convenient to drinking fountains. The provision of small, sawdust-filled boxes convenient to mats or boxing rings will also serve to promote health objectives in the combatives area.

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[1] F. G. Menke, Encyclopedia of Sports, New York, A. S. Barnes and Company, 1944, p. 277.

[2] National Collegiate Athletic Association, The Official Boxing Guide, New York, The National Collegiate Athletic Bureau, 1955, p. 44.

Where the combatives room provides three separate areas for boxing, wrestling, and fencing, the arrangement of these activity areas presents a serious functional problem. It is not feasible to provide separate entrances from the main gymnasium to each combatives area, yet care must be taken that students do not walk over mats or disrupt activities in order to reach their destination. To provide the most functional layout, it is suggested that the boxing room be located as the center of the unit, with the wrestling room on one side and the fencing and striking bag rooms on the other. The common entrance to the unit might well be from the main gymnasium to the boxing area, with separate entrances to other combatives areas from this room. Such an arrangement will serve to prevent students from walking over wrestling mats, and will also provide an entrance of sufficient dimensions where most needed. The entrance to the boxing room must be of sufficient height and width to provide free passage of a portable ring.

A suggested layout of the combatives room is shown in Figure 3.

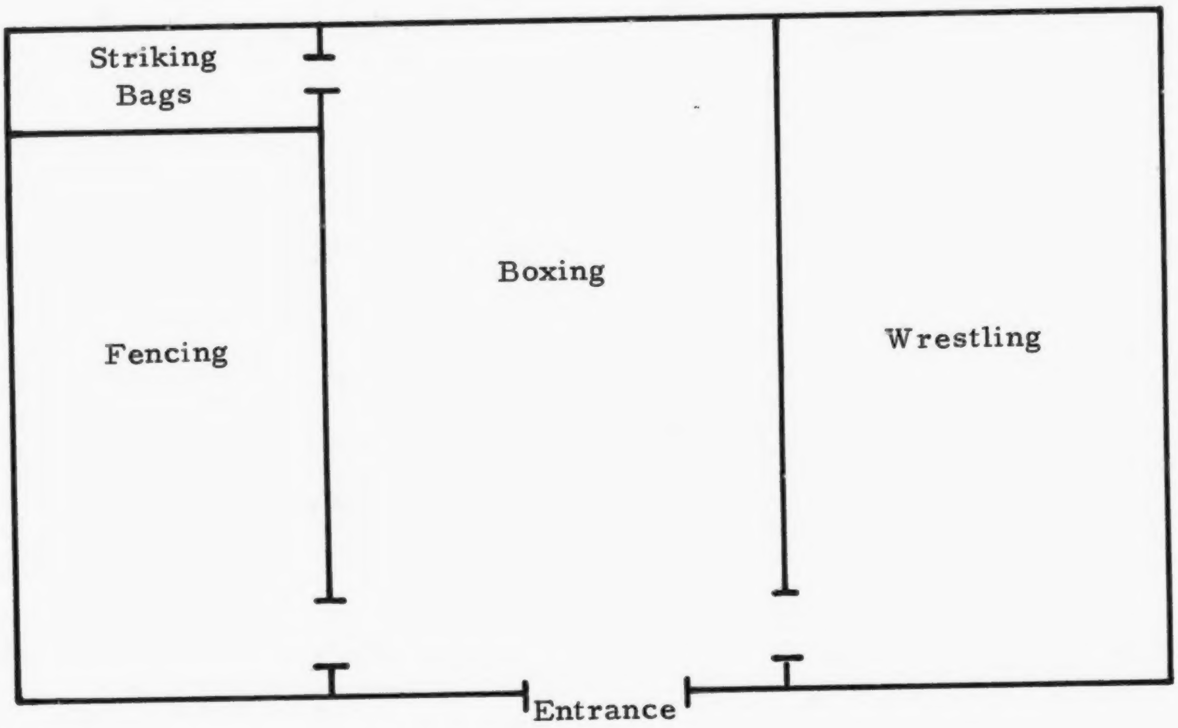

FIGURE 3. Suggested Layout - Combatives Area

Due to the strenuous nature of boxing and wrestling, it is important that room temperatures be maintained at a lower level than for many other areas of the building. Mechanical ventilation should be provided as a means of achieving correct air change, removing odors, and eliminating unhealthful drafts.

Since visual acuity is essential in the efficient performance of boxing and fencing skills, sufficient natural and artificial light must be provided, but care should be taken that windows are located where they will not interfere with the conduct of activities. Windows should be located above the height of wall safety mats in the boxing and wrestling areas. A sufficient number of overhead fixtures should be provided to insure an equal distribution of artificial light throughout the combatives area. It is suggested that a concentration of light fixtures be located directly over wrestling mats and boxing rings. The fixtures over these specific areas of the room should be focused to cast their light only on the mats or rings and to no other parts of the room.

Multi-purpose Auxiliary Gymnasium

Many colleges will undoubtedly feel that provision of separate areas for boxing, wrestling, gymnastics, and fencing is not only undesirable but may be economically impossible. If these activities are not included in the intercollegiate athletic program of the college, it may be much more desirable and economical to provide one multi-purpose room for class instruction. This room should be planned in terms of peak load during any one class period, the apparatus and equipment to be included, and the most desirable layout of the apparatus and equipment from the standpoint of function. One section of the room might be planned for boxing and wrestling, the other section for gymnastics and fencing. A storage room with sliding doors must be planned adjacent to this room as the apparatus and equipment will be stored away when not in use. The storage room must be of such size as to accommodate all the apparatus and equipment to be used in the various activities.

A minimum standard for such a multi-purpose room would be approximately 50 x 80 feet, thereby allowing reasonable space for a class of 40 students in any of the activities.

Special Activity Areas

The emphasis placed on recreational sports in the college physical education program indicates that facilities should be included in the building for such activities as handball, squash racquets, archery, riflery, bowling, golf, tennis, volleyball, badminton, and others.

It is realized that facilities for a few of the activities mentioned here may be provided elsewhere on the campus and, if such be the case, it would be unwise to duplicate these facilities in the physical education building. Where bowling alleys are provided in the student union building, for example, and these alleys are available for physical education class use, it would be a considerable waste of building funds to plan similar facilities for bowling in the physical education building.

Although certain gymnasiums and rooms in the building should be planned with a view to their flexibility and multiple use in the program, it is highly desirable that separate areas be provided for several of the recreational activities mentioned. Special consideration should be given the most satisfactory number, location, and layout of these facilities in terms of the local situation.

Handball Courts (Four-wall)

The provision of handball courts is essential for every modern program of college physical education. The number of courts provided will depend upon student enrollment and the average class size for handball instruction at the particular institution. Several authorities have recommended that the ratio of four-wall courts to men students should be one to one hundred. The following ratio seems more appropriate in terms of a realistic class instruction and recreational program.

Enrollment (men)	Number Courts Needed
500 - 1000	6
1000 - 1500	8
1500 - 2000	10
2000 - 3000	12
3000 - 5000	16
5000 - over	16 - 24

It is desirable that a sufficient number of courts be provided to accommodate the entire physical education class under actual game conditions. For example, where 40 students are to be enrolled in the average handball class, at least 10 courts should be provided.

The dimensions of handball courts should be determined by the official rules of the game. The official A. A. U. rules specify that the standard four-wall handball court shall measure 23 feet wide, 23 feet high, and 46 feet long.[1] If economy of funds and space is a vital factor in the construction program, four-wall courts of approximately 20 x 20 x 40 feet will prove generally satisfactory.

Those who like to play handball get the greatest pleasure when playing on a regulation court. A single-wall or a four-wall court, properly constructed, will attract many players, whereas a poorly constructed court or cramped playing area will quickly discourage those who otherwise might be interested in this excellent game.

It is desirable that courts be located convenient to the central locker and dressing rooms. Since the provision of windows is not a consideration, the courts may be located along a blank wall of the building. Care should be taken, however, that courts are not placed in an environment conducive to coal dust, dirt, smoke, or dampness. All too often in the past it has been a common practice to place handball courts in a dark, damp corner of the basement. The sanitation of all activity areas is of the utmost importance.

In the interests of economy, utility, and ease of supervision, it is desirable that courts be arranged in single or double rows, the latter being preferable where several courts are to be constructed. If arranged in two batteries, they should be placed in such a manner that the rear walls are separated by a corridor spproximately 5 feet wide and 7 feet high, above which may be a spectators' gallery.[2] The entrance to the spectators' gallery should be so located that those persons watching play do not have to walk through dressing rooms or activity areas.

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[1] J. H. Shaw, C. A. Troester, and M. A. Gabrielson, Individual Sports for Men, Philadelphia, W. B. Saunders Company, 1950, p. 234.

[2] The College Physical Education Association, op. cit., p. 42.

In order to achieve the most ideal conditions of handball play, the entire inside area of four-wall courts should present a smooth rebounding surface, unmarred by projecting light fixtures, beams, door knobs, heating or ventilating ducts, light switches, door hinges, or other obstructions which would influence the true bounce of a ball. Windows should not be placed in the walls. Rows of lights should be recessed in the ceiling about a foot from the wall along both sides and the front of the court, and reflectors should be so adjusted that they throw light downward and against the walls to prevent shadows and glare in the eyes of participants.[1] The lights should be covered with panels of unbreakable glass which are flush with the ceiling. Light switches should be located outside the courts on the wall convenient to the entrance. A small light on the switch panel which glows when the court is in use will prevent intrusion by players looking for a vacant court.

Heating and ventilating ducts should be recessed and flush with the wall, and located in the center of the rear wall if possible. Vents, if required, should be placed in the ceiling.

The entrance to each court should be through a small flush surface door located in the center of the rear wall. These doors should be of heavy wood, and so constructed that the bounce of the ball from their surface will be the same as from the surrounding wall surface. A small, shatter-proof glass panel should be provided in the doors, and should be flush with the inside surface. This will make it possible for persons to see into the courts without entering. Doors should always open toward the corridor, thereby preventing injury to players if a door should be suddenly opened while a game is in progress. The outside opening device may be of the common door knob type, but the inside device should be a small thumb ring latch fitted flush with the wall surface.

Since some players will find it necessary to expectorate during strenuous play, it is suggested that recessed and automatic-flushing cuspidors be placed in rear walls. A small door should cover the fixture opening which, when closed, is flush with the wall. If, in the interests of providing a smooth, unbroken wall surface, such a facility is not considered necessary, a self-flushing cuspidor should be placed in the corridor. This should be located convenient to all courts and should be in conjunction with a drinking fountain.

The surface materials of handball courts should be considered in view of their durability, cost and functional relationship to the optimum conditions of the game. The most desirable floor surface is hard maple. The floors should be kept as near their natural wood color as possible. Walls may be of hard maple, yellow pine, or solid concrete. Plaster is not highly recommended due to its tendency to crack, crumble, and its failure to withstand moisture. To prevent warping and dead-spots, hard maple or pine strips should be placed on top of diagonally-laid wood sheathing and the studding placed close enough together to prevent dead spots.[2] Where wooden walls are provided, they should be planed and sanded to prevent splinters or an abrasive surface. The selection of wall surfaces may be influenced by the fact that certain materials will "sweat" as the result of heat transmitted from the bodies of players. Ceiling surfaces may be of hard finished plaster. Walls and ceilings should be painted oyster-white or buff to improve visibility, but care should be taken that the paint is non-glaring.

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[1] W. L. Hughes, The Administration of Health and Physical Education in Colleges, New York, A. S. Barnes and Company, 1935, p. 299.

[2] The College Physical Education Association, op. cit., p. 42.

Handball Courts (One-wall)

Several suitable areas may be found in the physical education building for the location and layout of one-wall handball courts. Wherever there is present a smooth wall surface of approximately 20 feet wide and 10 or more feet high which provides an unobstructed floor area of approximately 30 feet, a one-wall court may be laid out for recreational and instructional purposes. The official A. A. U. dimensions of one-wall courts are 20 feet wide, 34 feet long, and 16 feet high.

Many institutions are now equipping their main gymnasiums with folding type bleachers which, when closed, are recessed and flush with the wall and present a hard, smooth rebounding surface. One-wall courts may be laid out the entire length of the bleacher area. Care must be taken, where courts are laid out in rows, to make certain that adequate free space is provided between each area. This will be necessary to prevent collisions and interference between players on adjacent courts. A distance of approximately 15 feet is suggested between the sidelines of adjacent one-wall courts.

If economy of building funds is not an obstacle, it may be desirable to provide a separate small gymnasium for indoor tennis and one-wall handball courts. Such an area would permit the continuation of tennis practice and instruction during inclement weather by providing a smooth wall of appropriate height, extending the entire length of the room, suitable for backboard tennis practice and one-wall handball. This wall should be entirely free of windows, doors, pipes, apparatus, or other obstructions. A line, 3 feet from the floor, representing the height of a tennis net, may be painted the length of the wall. Markings of a contrasting color may be painted on the wall and floor for handball play. At least 50 feet of clear space should be provided between long walls. For the average institution, however, it may be more desirable to plan for one-wall handball and tennis practice in an area of the building designed primarily for other activities. Many of the motor driven folding doors offer a smooth, hard rebounding surface which may be utilized for these activities.

Squash Courts

The number of squash courts provided will depend largely upon student interest in this sport at the local institution. Squash racquets may be exceptionally popular among students of a particular college or university but unless the popularity of the game warrants special provision, the official four-wall handball courts may serve the needs of the institution.

Squash courts are similar to four-wall handball areas from the standpoint of floors, walls, ceilings, lighting, heating, ventilation, and other construction features. The dimensions of squash courts are somewhat different, however, these being 18 feet, 6 inches wide, 32 feet long, and 16 feet high.

Where special courts are not included in the building for squash racquets, removable metal telltales should be provided which fit the front walls of handball courts. Storage space for these should be provided convenient to the courts to be utilized for squash racquets. A telltale is a strip of metal which extends across the front wall, its top edge 17 inches above the floor. It should be made of 18-gauge sheet metal, and should be constructed with a 2-inch bevel at the top, extending out from the surface of the wall at an angle of 45 degrees, so that the face of the telltale extends perpendicularly from floor to a height of about 15 1/2 inches, then slants in toward the wall. If properly constructed, the telltale will make a ringing sound when struck by a ball.[1]

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[1] Ibid.

It is recommended that at least one squash court of official dimensions be planned as a part of the handball-squash unit. If the popularity of the game so warrants, squash courts should be provided at the same ratio mentioned for handball courts.

Archery Range

The increasing popularity of archery as a recreational sport and physical education class activity suggests that indoor facilities be provided which will permit continuation of the activity during the winter months or when weather is inclement.

The under-stadium area offers an ideal setting and location for the indoor archery range, provided this consideration has been taken into account in the original stadium plans. If such plans have not been made, however, or if the stadium is not easily accessible to the student body, it may be desirable to include space for an indoor range as a part of the physical education building. Where possible, the space provided should permit a clear shooting range of at least 40 yards, and should be of sufficient width to permit four or more targets being placed approximately 6 feet apart along one end of the area.

Although it may not be possible to locate the indoor archery range convenient to the equipment supply and storage rooms, this should be a consideration in the location of the area. It would be further desirable to locate the archery range convenient to the recreation room, thereby permitting the use of the range in conjunction with other recreational facilities.

Special care should be exercised in the planning of the area to insure the safety of participants and others in the building. The archery range, particularly at the target end, should be so isolated that students participating in other activities will be in no danger from flying arrows. A thick baled-straw or other suitable padding should cover the entire width of the blank wall at the target area and should extend from the floor to the ceiling. Targets should be set on standards or hung immediately in front of the padding.

A row of lights should be placed at ceiling height directly above and in front of the target area. The reflectors on these fixtures should be so adjusted that light beams fall directly on the targets. The reflectors and bulbs should be protected by a heavy metal shield, or should be recessed in the ceiling. Similarly protected fixtures may be placed at the floor level in order to more adequately light the target area and to prevent shadows.

A recessed cabinet should be provided convenient to the firing line for the temporary storage of bows, arrows, leather arm guards, and other equipment used in the area. A sufficient number of racks and hooks should be included to accommodate the maximum equipment necessary for class and recreational use. If equipment will be stored at times other than during class periods, a metal door and lock should be provided.

A large tackboard should be located on a wall at the rear of the shooting area for the purpose of posting notices, announcements, and instructions. A protected light should be located immediately above the tackboard.

Riflery Range

Many colleges and universities sponsor riflery as an intercollegiate sport and as a part of the recreational program. This is particularly true where an R. O. T. C. unit exists at the institution. The ideal location for the riflery range is in the armory, if such a building is part of the campus plan, or in the under-stadium development. If provision has not been made elsewhere, space may be planned for this purpose in the physical education building.

Since National Rifle Association indoor matches are conducted at a distance of 50 feet, it is desirable that the space provided be approximately 90 feet long and 55 feet wide. This will insure official match distance, provide space for ten firing tables and mats, and allow sufficient area behind the firing line for a small sound-proofed room equipped with gun racks, storage cabinet, scoring table, benches, tackboard, chalkboard, and other equipment needed in the conduct of the activity.

Special consideration should be given to the location of the range in an isolated and protected part of the building to insure the safety of individuals and to eliminate disturbance to other activities. A suitable, unobstructed area of the basement will make a desirable location if consideration is given in the original building plans. The entire area should be surrounded by sound-proofed and bullet-resisting material. Acoustically treated concrete walls will satisfactorily serve this purpose, and if provided, may be planned as part of the building's supporting structure. The entrance to the rifle range should be through a sturdy, sound-proofed door which opens directly into the after-room. The entrance may be from the corridor or from the outside, the latter being preferable. A sound-proofed partition and door should separate the firing area from the after-room. This will eliminate disturbing noises for persons in both the after-room and on the firing line. A partition of this type serves the added function of providing a lighted area for the scoring of targets, posting of scores, care of firearms, and other activities of this particular room. There should be no lights in the firing area except those which throw their beams directly on the targets.

Since rifles, cartridges, targets, and other equipment are usually stored in the rifle range, it is important that a rifle rack and storage closet or cabinet be provided. These should be recessed in the walls and so constructed that they may be securely locked when the range is not in use.

The National Rifle Association makes the following recommendations for the construction of indoor rifle ranges:[1]

> Over-all dimensions of ranges. The distance from firing points to targets should be 50 feet. The minimum distance between firing points should be 4 feet 6 inches. If space permits, a minimum of 10 firing points is recommended. Approximately 6 to 10 feet should be provided behind targets to accommodate backstops, and not less than 15 to 20 feet behind the firing line to accommodate shooters.
>
> Backstops. Sandbox backstop, steel backstop, or commercial bullet traps may be used. The simplest sandbox backstop is made from packing case at least 2 inches thick, filled with sand; extra thickness of heavy boards nailed over the front of box will give extra protection and longer wear. The steel backstop consists of a 3/8 inch steel plate supported at angle of 30 to 45 degrees at a distance of about 2 feet behind the targets. A sandbox should be placed on floor in front of steel backstop to catch deflected bullets. Whatever type of backstop is used, the surrounding area in target end of room should be protected against stray shots.

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[1] Industrial Recreation Association, Standard Sports Areas. Chicago. The Association, 1944. pp. 31-32.

Ventilation. Indoor ranges should be provided with sufficient ventilation to carry off powder fumes.

Lighting. Indoor ranges should be lighted over the entire length. Modern ranges usually provide even, indirect lighting over the entire range or fluorescent lighting over targets, indirect lighting over firing line and behind it, with increasingly brighter lights between firing line and targets.

It is desirable that light fixtures be located above and below, and directly in front of the target area, and the reflectors adjusted to cast their light on the target without causing shadows. These fixtures should be protected from stray bullets. It is suggested that the targets be located approximately 4 1/2 feet from the floor, so that shooters will be aiming along a parallel line whether firing from the standing position or from the prone position while lying on firing tables. A target screen should be provided of the type which can be run out and drawn in from the firing line by means of a pulley system.

Detailed information regarding range construction, including the pamphlets "Rifle and Pistol Shooting for Recreation and Defense" and "Instructor's Manual for Junior Rifle Clubs", are available from the National Rifle Association.

Bowling Alleys

If bowling facilities are not available for student and faculty use elsewhere on the campus, their provision in the physical education building will prove an extremely valuable addition to the required and recreational physical education program. Hughes[1] presents the following pertinent argument for their inclusion in the building plans:

> "The extent to which college men and women enjoy bowling if alleys are provided in the gymnasium is really astonishing. Unfortunately, few college gymnasiums are equipped for this excellent sport, but in institutions where the activity is promoted it may well form a part of the required, intramural, intercollegiate, and recreational program. As a "carry over" sport it ranks as one of the best. Moreover, it appeals to the students and is one of the most popular activities on the program where it has been offered."

There is no doubt but that college and university physical education programs are increasingly being directed toward the offering of instruction and participation in a broad variety of recreational sports in which students will actively engage both during their brief educational careers and in adult life. Bowling ranks as one of our leading adult recreational sports. Although the initial cost of bowling alleys is rather high, such funds are justified in view of the contribution the alleys will make to student and faculty recreational enjoyment. After the alleys are provided, the expense of promoting and maintaining the sport will be negligible.

It is suggested that the number of alleys provided be determined by such factors as student enrollment, the accessibility of bowling facilities on or near the campus, local interest in the activity, and the climate in which the institution is located. In those areas of the country having an extremely short winter sports season, the number of alleys needed will be considerably less than where the indoor season is of relatively long duration. For the average college located in climates which favor such indoor recreational sports, it is suggested that the ratio of bowling alleys provided in the building be one alley to each 200 students.

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[1] W. L. Hughes, op. cit., pp. 301-302.

The location of bowling facilities should be convenient to, but not in the recreation room. Because of the considerable noise associated with the activity, it is highly desirable that alleys be located in a separate and sound-proofed area. Access to the bowling area should be by means of the outside entrance provided for the recreation unit, thereby permitting the isolation of this unit from the rest of the building. It is functionally advantageous to provide an entrance directly from the recreation room to the rear of the bowling area.

Consideration should be given to the construction of a small permanent bleacher area for spectators, located at the rear of the room. A railing or partition approximately 3 feet high should separate the bowling area from the spectator gallery. It is important that such a railing be placed no less than 15 feet back of the foul line to allow bowlers sufficient space for a clear run prior to release of the ball.

Special attention should be devoted to the comfort of performers and spectators in the bowling alleys. A well lighted, sound-proofed room, equipped with adequate heating and ventilation systems, will add greatly to the enjoyment of the activity. Mechanical ventilation should, by all means, be included in this area. Mention should be made here of the extremely well planned and functional alleys provided in the Student Union Building at the University of Illinois. The alleys have been sound-proofed to such an extent that almost no noise is heard from falling pins. A normal conversation is possible, even when all alleys are in use and the bleacher area is filled to capacity. A mechanically operated ventilation system maintains comfortable room temperature at all times and eliminates the smoke and stuffiness so commonly associated with bowling alleys. A thermostatically controlled heating unit adds to the comfort of the bowlers and spectators.

It may be desirable to include a small snack-bar as a part of the bowling room. This will be unnecessary, however, if bowling alleys are planned in connection with the recreation room. It is important that drinking fountains be conveniently located in the area, and that receptacles for cigarette butts be provided for bowlers and spectators. A large tackboard and chalkboard should be provided and placed in such a location that bowlers and spectators can easily see announcements, posted scores, schedules, and other notices pertaining to the activities of the area. Sufficient seating accommodations for bowlers should be provided at the rear of the bowling area, and a movable score table or stand should be provided for each alley. It is important that a clock be conveniently located on a side or rear wall.

No attempt will be made here to discuss the actual construction of the bowling alleys and the equipment relating to their use. Such information can, and should, be obtained from representatives of the company from which equipment is purchased. These men are experts in the construction and layout of bowling facilities. Care should be taken, however, to ascertain that sufficient space is provided at either side and behind the bowling pits to enable pin setters to walk to and from their stations without the necessity of traveling down the alleys or gutters. Failure to provide such space has been a common error at many institutions providing bowling alleys. Automatic pin-setters would be desirable.

Hobby Room

A special area of the building may be planned and equipped as a workroom for those students and faculty members having recreational hobbies such as model airplane construction, basketry, cabinetmaking, leather craft, metal craft, photography, ship model building, and other special handicrafts. Where a program in recreational leadership training is offered at the institution, this room may also be utilized as a laboratory for those major students.

The essential factors to be considered in the planning of thisarea are the specific activities which it is intended to make possible, the number of people who will be accommodated in these activities at any given period, the special needs in terms of equipment, and the flexibility of the room.[1]

Special attention should be given to the matter of storage space for the tools and equipment used in connection with this area. Large storage closets and cabinets should be provided, and these should be equipped with appropriate shelves and hooks according to the specific storage needs for handicraft materials. It will be necessary to plan for adequate electrical outlets of appropriate type and voltage convenient to the work benches upon which various machine and electrical tools will be used.

If possible, the location of the hobby room should be convenient to the recreation area, thereby making it feasible to isolate this general part of the building for use at night.

Rowing Tank

If crew is included as in intercollegiate sport at the institution, it may be desirable to provide an indoor practice tank for use during the winter months and in inclement weather.

Specifications for indoor rowing equipment may be secured from the manufacturers, and the details of tank construction may be secured from the Office of the Intercollegiate Rowing Association.[2]

Where a rowing tank is planned, its location may be in the basement, underneath the permanent spectator area in the main gymnasium, or in any part of the building which is adaptable to the special needs of this activity. If possible, its location should be convenient to locker and equipment supply facilities.

Social and Recreational Facilities

It seems highly desirable that institutions of higher learning make provision for such facilities as may be needed in the social and recreational activities of the physical education program. These activities may vary in accordance with the type and enrollment of the local institution, the provision of similar facilities elsewhere on the campus and the administrative policies as regards social organizations and clubs. As a general rule, however, the physical education building will provide facilities for such social and recreational functions as dances, banquets, lectures, demonstrations, and formal or informal meetings of various campus organizations. It is particularly important that facilities of this type be provided for the organizations and clubs which are sponsored by the physical education, athletic, and recreational departments of the college or university.

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[1] G. D. Butler, Introduction to Community Recreation, New York, McGraw-Hill Company, 1940, p. 182.

[2] The College Physical Education Association, *op. cit.*, p. 43.

Recreation Room and Lounge

A large recreation room and lounge may well be planned as a part of the physical education building. It should be of sufficient size to accommodate the desired recreational facilities and also a generous lounging area. Equipment may include table tennis equipment, pool and billiard tables, shuffleboard areas, dart boards, tables for checkers, chess and card games, a phonograph and radio, television set, soft drink vending machines, and several pieces of comfortable furniture. Consideration should be given to the provision of a small dance floor as a part of the area.

The recreation room should be located convenient to both the men's and women's dressing and locker rooms. Such a location will encourage bathing upon completion of the participation. It is highly desirable that the room be located in a wing of the building, thereby permitting the isolation of this area. It is further suggested that the location be on the ground level or first floor, and that a separate entrance from the outside be provided to the area. A location such as that mentioned here will permit the use of the recreation facilities at times when the rest of the building is locked.

Space provision will be required for the storage of equipment and supplies used in this room. The storage area should be located adjacent to the recreation room and should be of sufficient size to accommodate all equipment that must be stored if the area is to be utilized for such functions as banquets, dances, parties, and registration.

Consideration might be given to the provision of a small snack bar in connection with the recreation room.

Attention should be given to the lighting, heating, and ventilation of the recreation room. The area at the University of Florida is cited as an excellent example of functional planning. Full-height louver type windows extend the entire length of one side wall, and directional glass blocks provide adequate natural light, without accompanying sun glare, from the opposite side of the area. Overhead fixtures are of the semi-direct fluorescent type. A combination air conditioning and heating system maintains desirable room temperature, both during the winter and summer months.

Meeting or Club Room

Physical education buildings constructed in the past have oftentimes failed to provide a meeting place for those organizations or groups associated with the program. It is desirable that original building plans include space provision and equipment for this purpose.

McKown[1] lists the following basic principles underlying the planning of such an area:

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[1] H. C. McKown, "Housing and Equipping the Activities Program," American School and University, 13th ed., New York, American School Publishing Corporation, 1941-42, pp. 265-67.

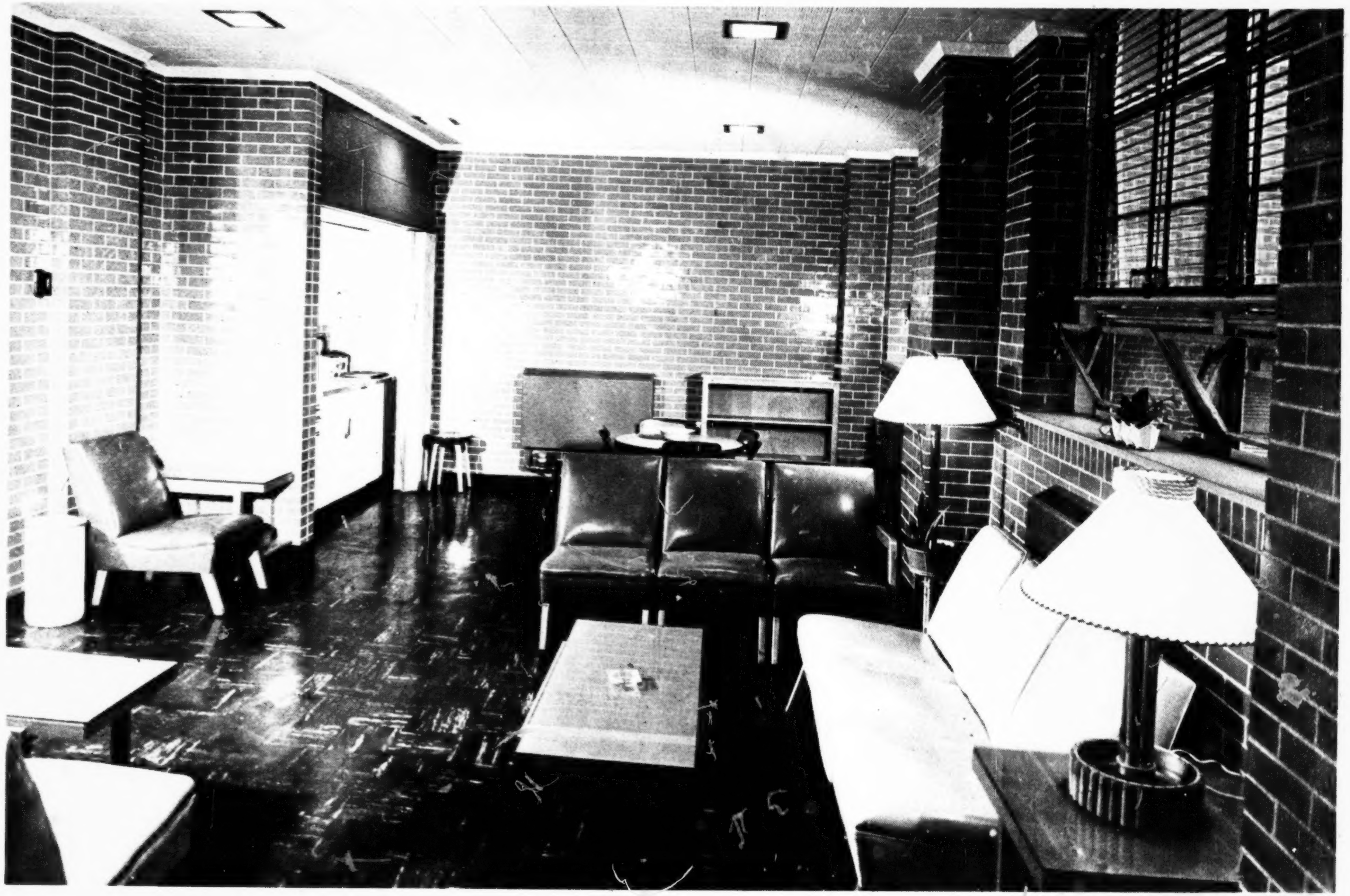

PLATE 7. Student Lounge, Mary Channing Coleman Gymnasium, Woman's College, University of North Carolina, Greensboro, North Carolina. Courtesy of Department of Physical Education, Woman's College. This attractive room was designed for student use during leisure hours and is also used for small departmental gatherings. A kitchenette with complete facilities for preparation of snacks and refreshments is located behind double doors at left rear.

> "Activity space should be permanently assigned. Clubs and organizations should be provided a permanent meeting place where the necessary equipment, supplies, and material are available and where the activity itself is safe from interruption.
>
> The space assigned should be neither too large nor too small. The space provision depends upon the organizations and groups to be housed--their size, the equipment and materials utilized, and the activities engaged in. The space should be large enough to accommodate the activity without inconveniencing the participants by requiring them to stand, sit two in a seat, etc., and large enough for adequate storage space, if necessary. On the other hand, from the standpoint of economy and utility, it should not be so large as to provide considerable dead space.
>
> The activity room should be conveniently located. Too often activities are assigned to some unused space, often in an out-of-the-way place. The room should be located where it is easily accessible to the group who will use the facilities.
>
> The space utilized should be private while the activity is is session. Distraction and disruption are the sure concomitants of a setting in which more than one activity uses the same space at the same time, or where students and others frequently pass through the room.
>
> Adequate permanent equipment should be provided. One of the disgraces of educational planning is that often the space is provided for activities but such space provision is inadequately equipped."

The location of the club room may be planned in the section of the building devoted to class rooms, or it might be included convenient to the recreation room area. The latter location would have the advantage of providing access to the room when the main part of the building is locked. This factor is of some importance in planning, since the club room will be used frequently during evening hours. In addition, the principle of economy may be followed through the joint use of storage space provided in conjunction with the recreation room.

Equipment should include at least the following: movable tablet-arm chairs, desk, filing cabinets, chalkboard, tackboard, work tables, a rack for such periodicals as may be of interest to the groups involved, and recessed book shelves. Consideration might be given to the equipping of this room for audio-visual machines.

The standards for lighting, heating, and ventilation of this area will be similar to those for class rooms.

Food Service

It has been noted that a common error in the planning of physical education buildings is the failure to provide facilities for the preparation and serving of food. Such oversight or neglect on the part of those responsible for planning is difficult to comprehend, since very few physical education buildings exist which are not utilized frequently for dances, banquets, and other social gatherings at which food or beverages are served.

Where the building is to be used for social functions, it should not be necessary to transport food from other areas of the campus. A separate and permanent kitchen or kitchenette should be planned as a part of the building, and located adjacent to those areas which it will commonly serve.

If the recreation room is planned to accommodate such functions as banquets, parties, and dances, a desirable location for the kitchen will be adjacent to this area. The location of food service facilities in connection with the recreation room has the advantage of permitting the isolation of this section of the building when social functions are in progress and when the rest of the building is locked. In those institutions where the main gymnasium floor is utilized for all social events held in the building, food service facilities should be on the same level and adjacent to the main floor. Many colleges find it desirable to include the kitchen adjacent to both the main gymnasium and the dance studio. The kitchen should be planned and located to serve as many desired areas as needed without the necessity of transporting food across public circulation.

It will be desirable to provide a serving window and counter between the kitchen and that adjoining room in which social functions are normally held. A wall opening and counter will serve the purposes of reducing confusion in the kitchen, eliminating many extra steps by those persons transporting food, and increasing the efficiency of food service. The wall opening should be large enough to permit passage of food trays, and the counter should be of sufficient width to handle trays and plates. The serving window should be equipped with a sliding or pulldown panel which makes possible the isolation of the kitchen and noises that may interfere with speakers or other activities of the social gathering.

The size of the kitchen should be adequate to house equipment necessary for the preparation of food and to permit the unhampered activities of those working in this room.

The kitchen must be adequately equipped with electric outlets, and careful attention should be given to the problem of ventilation. It is highly desirable that mechanical ventilation be provided, and that suction fans be located above cooking units to carry odors and heat directly to the outside.

It is advised that those persons responsible for food service in other buildings of the campus be called upon to assist in the planning of this area.

CHAPTER V

SERVICE FACILITIES

Locker, Dressing and Shower Facilities

In view of the fact that locker-dressing-shower facilities serve all areas of the building, and all activities of the program, they may well be considered as the "nerve-center" of the physical education plant. The success of a program of physical education in a college or university depends to a great extent upon the convenience of facilities and the comfort provided in the dressing rooms.

It is of considerable importance for educators and those persons responsible for planning to realize that the expressed dislike for physical education by many students is oftentimes directly traced to cramped, unattractive, and unhygienic conditions in locker and shower rooms. When we take into consideration the fact that students spend over one-third of the average physical education period in dressing, undressing, and showering, the implication is extremely strong for more than casual planning of these service facilities. Failure to consider the hygienic and health objectives of the program will ultimately defeat the very foundation upon which it is founded. All too often, educators have given lip service to the virtues of healthful living and the need for development of desirable health habits, yet in the operation of facilities which serve the program every principle of sanitation and personal hygiene has been broken. In no other phase of the program can health objectives be realized to the extent possible in the efficient operation of locker, dressing, and shower facilities.

The need for activity areas is usually more obvious than the need for adequate auxiliary service facilities. This may account for the fact that it is common to witness construction which has emphasized activity areas or those which come before the eyes of the public. In many instances, planning has neglected those service facilities upon which depend the successful outcome of the total program. It is unfortunately true that public pressure, combined with planning by department directors who are primarily concerned with seating capacity and gate receipts, has resulted in large numbers of huge basketball arenas served by gloomy, unsanitary, cheap, and ill-conceived locker and shower rooms. Failure to provide for those facilities which promote health objectives can be explained only by lack of information and lack of intelligent planning.

General Considerations

The following general considerations should be taken into account when planning locker-dressing-shower facilities:

Program - The building committee, prior to the actual planning of facilities, should learn the answers to certain questions pertinent to the program to be served, such as:

1. How many semesters will the average student be enrolled in the required instructional physical education program?

2. How many students will be enrolled in required classes during the average semester?

3. How many students will be assigned to each class section?

4. How many periods each week will each class section be scheduled to use facilities?

5. Will classes in different activities be scheduled during the same period of the day?

6. Will the schedule provide for overlapping of classes?

7. How much time will be allotted for dressing before class and for bathing and dressing after physical education class periods?

8. How will the persons who use facilities be dressed?

9. What future extensions or modifications of the program may be anticipated?

10. What will be the approximate peak load during the busiest period of the day?

11. Will intramural sports activities be scheduled during the the periods of class instruction?

12. Will required class activities, intramural sports, and intercollegiate contests or practices be scheduled simultaneously? If so, what will be the total number using the facilities?

13. Will physical education classes for women be held in the building? If not, will separate dressing and shower facilities for women be required by the co-physical education or co-recreational program?

14. Is it advisable to provide separate facilities for freshmen and varsity athletic teams? Should separate facilities be provided for the physical education staff, general faculty, visiting teams, and athletic game officials?

Location - Locker and shower facilities should be located so as to provide ready and direct communication to gymnasiums, natatorium, playfields and class rooms. Ideally, they should be located adjacent to and on the same floor level as the activity areas they serve. The more common location, however, is beneath the areas served. In addition to accessibility, it is important that consideration be given to the availability of adequate space and proper segregation of such facilities from the public.

Space Provisions - In addition tolockerand shower rooms, certain other service facilities are needed. These include toweling rooms, drying rooms, storage rooms, laundry service, equipment-supply rooms, custodial facilities; and where athletic teams use physical education facilities, a training room, team rooms and auxiliary locker, shower, storage, and office provisions must, in most instances, be provided. In every case, adequate provision must be made for toilet and lavatory facilities.

Layout of Space Provisions - The functional placement and arrangement of whatever space provisions are made should be given careful study in the planning of the building. Care should be taken to eliminate cross-traffic, reduce student travel to the minimum, avoid points of congestion, promote hygienic conditions, and simplify the problems of administration and supervision of service facilities. Some of the more general points for consideration are as follows:

1. Locker rooms should be readily accessible for students. It should not be necessary to walk long distances through corridors to reach locker-dressing facilities.

2. Direct access to indoor and outdoor activity areas should be possible from the locker-dressing rooms.

3. Where a swimming pool or natatorium is provided, the layout should be such as to normally route swimmers from locker rooms to toilets to shower rooms and then to the swimming area.

4. Shower and toweling rooms, toilets, equipment supply rooms, training room or rooms where tote-baskets are stored should be located directly off the locker-dressing area.

5. Locker room toilet facilities should be readily accessible from the line of travel of students to the shower room. Water closets and urinals should not be located in the shower room itself or in the toweling room for bathers. Likewise, they should not be located at the end of the locker room most remote from shower facilities.

6. Toweling rooms for bathers should be so located that entrance is provided directly from showers, with bathers then routed to the dressing area.

Locker and Dressing Rooms - The number and placement of these areas in the building should be determined by student enrollment, the extent of the physical education program, the number and location of gymnasiums and activity areas provided in the school plant, and the extent to which provision must be made for both sexes. The dimensions and interior arrangements of a given locker and dressing room should be based upon the sex and number of students which must be accommodated, the largest number that must be cared for at a given time, and the type of locker system or dressing facilities provided. Architects can figure out space needs if given the information mentioned above.

Where possible, the modern college or university physical education building should provide locker, dressing, and shower units for the following groups: (1) the general student body, (2) athletic teams, (3) physical education staff, (4) general faculty, (5) athletic game officials, (6) members of the opposite sex, and (7) maintenance personnel. These units should be considered separately in the planning of the building, as each presents problems and requirements peculiar unto itself.

Locker Plans - Locker and dressing provisions may consist of any one of several types. The more common plans are as follows:

1. Individual locker systems - Each student is assigned a full-length or half-length locker, equipped with lock.

2. Combination common and box locker system - Banks of small storage lockers are provided in conjunction with fewer and larger dressing lockers. Each student is assigned a box locker in which his gymnasium costume is stored. For each five to seven box lockers, a full or half-length locker is provided in which, at different times, five to seven students store their street clothes during physical education activity periods. The combination locks from box lockers are used on the larger dressing lockers during class periods.

3. Combination fixed and basket lockers ("tote-basket") plan - A sufficient number of full-length lockers are provided to care for the peak load in the dressing room at any given period of the day. Each student is provided with an individual wire basket for storage of his gymnasium costume. The baskets may be kept in a special basket locker room under the control of an attendant who distributes them to students, or they may be housed in metal racks which are either located in the dressing room or wheeled on trucks into this area for each class period.

There are three common variations of the "tote-basket" plan, each of which has certain merits, and each of which is proving efficient in actual operation at many institutions throughout the nation. Since these plans are particularly designed for use in the central dressing and locker room, they will be discussed under that section of the chapter.

Shower Rooms and Facilities - A shower room should be provided in connection with each dressing and locker room in the physical education building. In certain instances it may be possible, and highly desirable, to locate shower rooms whereby they serve more than one dressing area.

Most shower room do not provide sufficient shower heads for the number of students to be served. The number of shower outlets that should be provided depends not only on (1) the number of students that will use the facilities during the peak period of the day, but also on (2) whether "gang" showers or individual dressing and shower cubicles are provided, and on (3) the length of time allotted for bathing and dressing.

At present, there is an increasing trend in the direction of gang showers for both men and women. Gang showers require less floor area, involve a smaller initial outlay, require less operational cost, and can be more effectively supervised, maintained, and cleaned than the same number of individual showers. It is highly advisable, however, that where gang showers are provided in the womens' area they be supplemented by some individual shower and dressing cubicles.

If gang showers are provided, one shower outlet will suffice for three women or four men students. If individual showers are provided in connection with one or more dressing cubicles, one shower outlet should be provided for two to four dressing

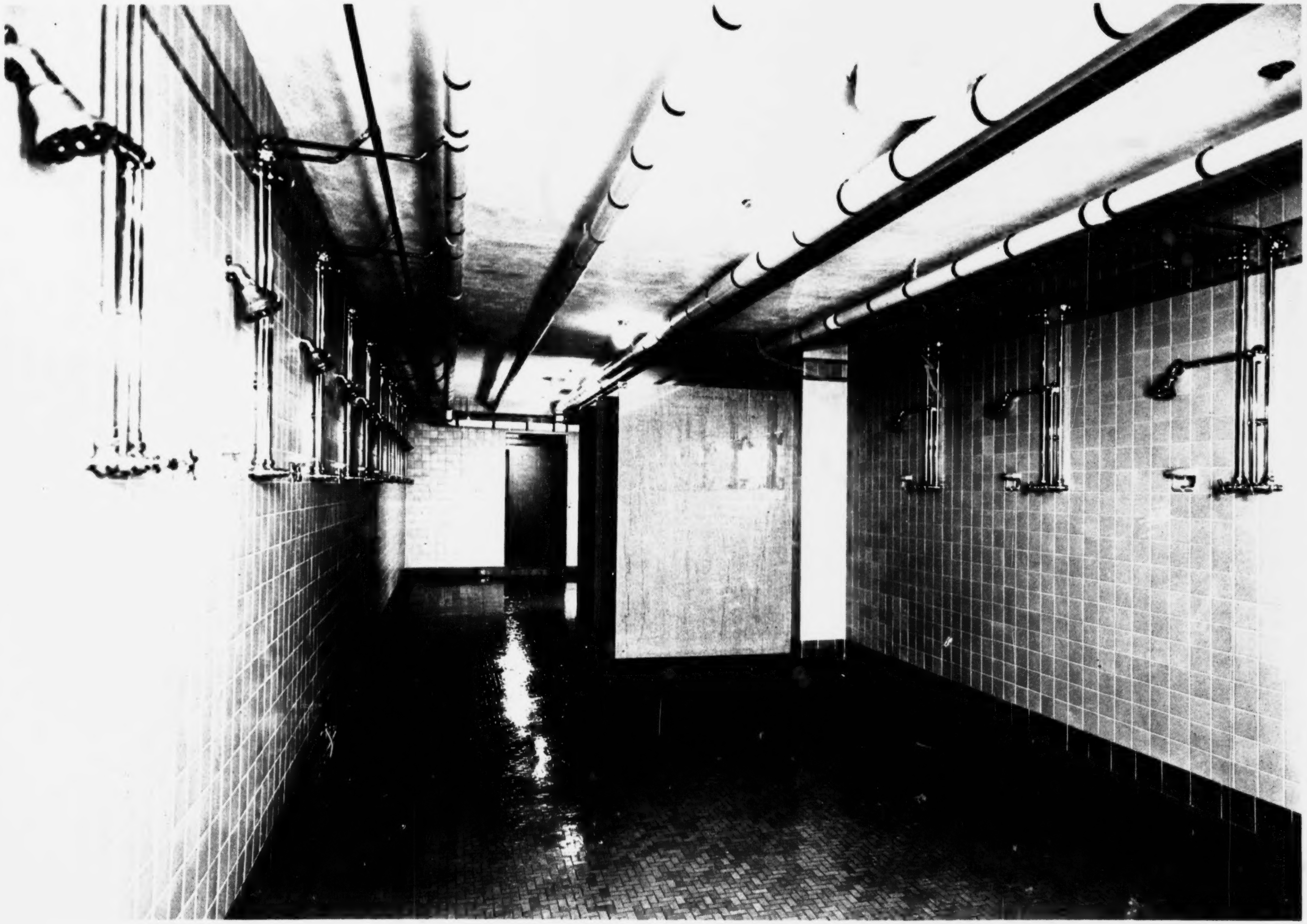

PLATE 8. Shower Room, Woollen Gymnasium, University of North Carolina, Chapel Hill, North Carolina. Walls are of glazed tile, floor of ceramic tile. Note toweling room at far end, side floor drains, overhead ventilation, individual hot and cold water adjustments, and recessed soap trays.

cubicles.[1]

Overhead showers have some advantages over side-wall fixtures. They permit a greater number of students to use the shower room at the same time than do the side-wall type, are more economical, and are less likely to be damaged. Overhead fixtures have the disadvantages of forcing the bather to wet his hair and get water in his eyes. Side-wall fixtures are suggested as being more satisfactory for colleges.

The following suggestions are presented as being pertinent in the planning of shower rooms and shower facilities:

1. It is important that the amount of shower room floor area provided per shower be ample. A space approximately 3 feet x 3 feet should be allowed for each shower head.

2. In connection with gang showers, it is recommended that a toweling room for bathers be provided large enough to allow at least 15 square feet of drying space floor area for each three to five students in the largest class section or during the peak load.

3. The disadvantages of the lane, zone, or progressive battery showers probably outweigh their advantages.

4. Side-wall fixtures with pipes accessible from plumbing chamber or exposed in shower room are usually preferable to over-head plumbing and fixtures. Chrome fittings, non-corrosive concealed piping, fixtures bolted through walls to withstand rough use, and as tamper-proof as possible, are desirable.

5. Shower heads should be of the ball and socket instead of rigid type, tamper-proof, self-cleaning, and such as to conserve water by restricting the spread of the shower spray.

6. Mounting height of shower heads should be approximately 6 feet from floor, and the mounting height of soap dispensers should be about 2 feet lower. The mounting height of shower heads may be lower for women than for men.

7. Individual shower control by means of manually operated controls for hot and cold water is more desirable than the central control method. It is advisable, however, to thermostatically control the maximum hot water temperature.

8. Shower and toweling room floors should drain toward the sides rather than toward the center. Drains should be of ample size to care for the water run-off at peak loads.

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[1] The College Physical Education Association, op. cit., p. 26.

9. Shower rooms should be fully partitioned off from locker or dressing space, but cased openings without curtains should be provided for direct travel and communication.

Auxiliary Service Facilities - The well-planned locker and shower room should be provided with additional facilities other than those commonly concerned with dressing and bathing.

Toilet rooms should never be located in dressing or shower rooms, but adequate toilet facilities should be provided which are immediately accessible to students to accommodate the needs of the largest class section or peak load. It is recommended that no fewer than two fixtures of any kind should be installed as this will insure at least one being in good repair at all times.

A suggested ratio of fixtures to students in the peak load is as follows:[1]

Urinals	1 fixture to 25 students (males)
Water - closets	1 fixture to 25 students
Lavatories (wash-bowls).	1 fixture to 25 students (or 1 to 2 of the other fixtures)

The college should provide soap in connection with showers and lavatories, preferably in the form of liquid soap with one manually operated dispenser to serve each lavatory or each two gang shower fixtures. If cake soap is provided, there should be a recessed, non-rusting soap tray for each two shower heads. The provision of cake soap has the disadvantage of being costly as well as promoting a safety hazard. Students tend to leave cake soap lying on the shower room floor after bathing, where the soap dissolves and results in slippery footing. If soap is picked up and used, an unhygienic situation may exist. Liquid soap has the advantage of being economical, and it can be piped to outlets from a central source where the supply on hand can be readily determined or replaced with a minimum of effort and delay. Soap dispensers should be securely fastened to the wall between shower heads as constant use will loosen fixtures that have merely been attached by screws.

Paper towels should be provided in connection with lavatories. These should be housed in suitable metal dispensers, securely fastened, and convenient to the lavatories. Suitable waste receptacles should be provided near towel dispensers.

As a general rule, few dressing rooms are supplied with sufficient mirrors to accommodate the number of students who utilize facilities during the peak load. It is suggested that mirrors be placed at the ends of every other double locker row and on open walls. The height of mirrors should be such that they are functional for either tall or short students, a distance of about 4 feet 6 inches from floor to bottom edge of mirrors being recommended. In womens' dressing rooms, one or more full-length mirrors will be appreciated.

At least one drinking fountain of the water cooler type should be provided in the central dressing and locker room, and a fountain should be provided either in or

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[1] The College Physical Education Association, *op. cit.*, p. 25.

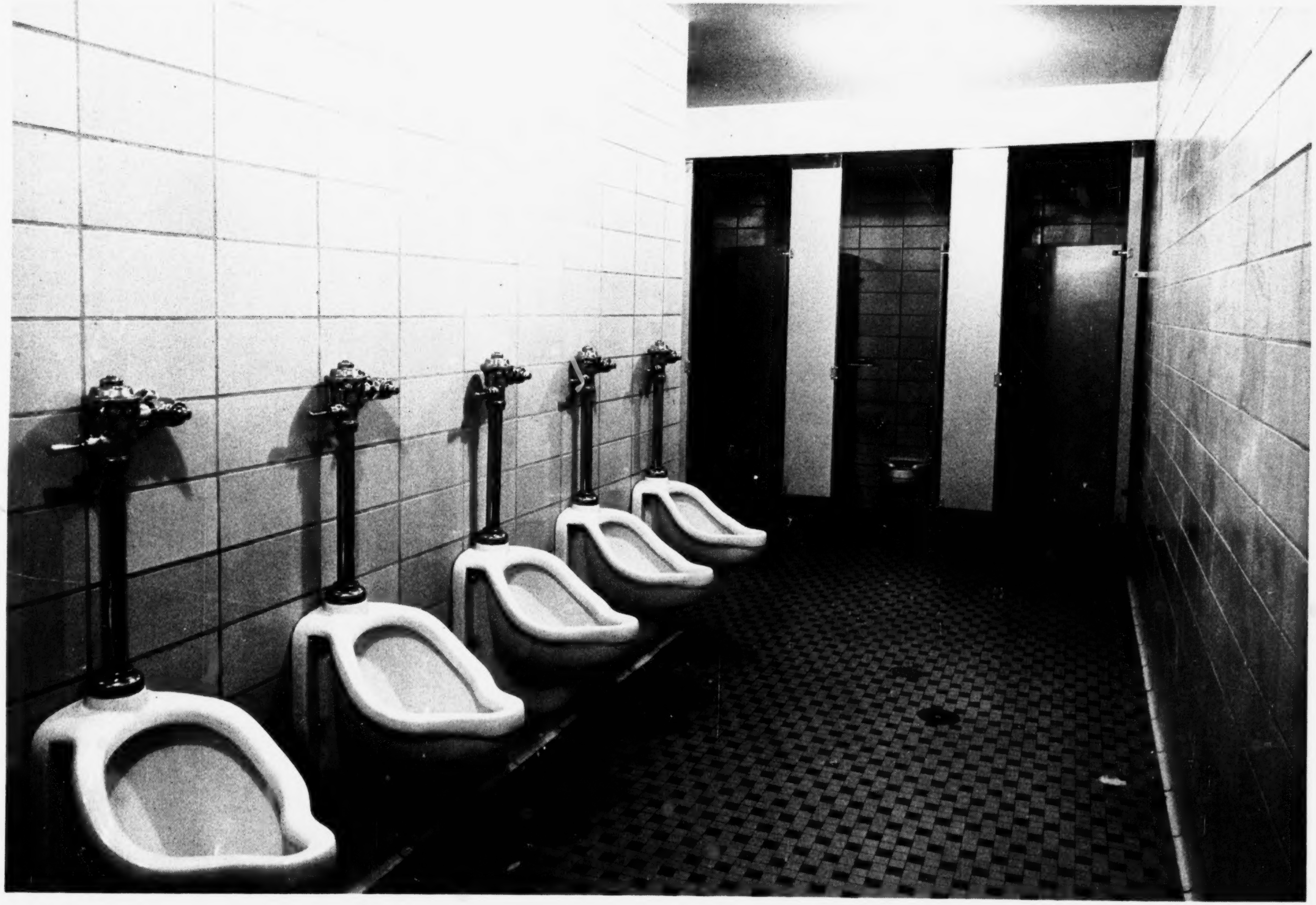


PLATE 9. Toilet Room, Men's Locker-Dressing Suite, Physical Education Building, University of California, Riverside, California. Unrinals are wall hung and toilet stalls are ceiling hung to promote ease of floor cleaning. Heating and ventilating units are recessed in ceiling and covered with metal grille. A metal shelf, which folds against the wall when not in use, is provided in each toilet stall.

convenient to other dressing areas of the building.

It is important that hose connections be conveniently located in locker-dressing-shower units to facilitate ready hosing of floor surfaces by custodial personnel.

Surfaces - In addition to providing an attractive appearance, floor surfaces in dressing, shower, toilet, and drying rooms should be selected which (1) can be easily cleaned, (2) will not crack, chip or scratch under cleated shoes, (3) will not absorb water, and (4) are safe and comfortable for bare feet. The principle of safety suggests that all floors in these areas be of a non-skid material to reduce the number of accidents due to falling.

Wall surfaces should be selected which are moisture resistant, easily cleaned, and will not crumble or crack. It is preferable that wall and ceiling surfaces be of a light color which will materially assist in reflection of light throughout the area.

Water Supply - One of the commonly voiced complaints of students concerning the locker-shower unit is that hot water is not available during times of peak load. Functional planning should be concerned with the provision of a water heating system that will insure hot water throughout the day. It is suggested, also, that a reserve tank be provided to permit normal operation of the area at times when the central water supply is out due to an emergency.

The Central Dressing-Shower-Toilet Suite

A central, or main, dressing-locker-shower-toilet suite should be provided for general use by physical education class personnel, intramural sports participants, and those students taking part in both organized and informal recreation activities.

In conformity with the principle of accessibility, the central suite should be located so as to permit quick access to the activity areas it serves. It is important that dressing and shower facilities be adjacent to the natatorium in order to facilitate routing of swimmers from the locker room to the showers to the swimming area. It should be possible for students to enter the locker room directly from outside, without having to cross playing floors or travel through long corridors. Entrances and exits should provide direct communication with play fields and other activity areas.

Care should be exercised in the planning process to provide ready communication from locker or dressing space to other service facilities, such as basket lockers, showers, toilets, and the equipment supply room. By all means, the dressing and locker room should be on the same level and adjacent to these service areas. The relationship of the various rooms should be such that students are routed from the locker room to toilets to showers to natatorium and back to showers to toweling room to toilets and then to the locker room. Those students not using the natatorium would be routed from the locker room to toilets, the showers, the drying area, and back to lockers. Those students not wishing to use the shower room should have direct access from the locker room to toilets and lavatories.

The accompanying diagrams and photographs illustrate satisfactory arrangements in several modern physical education buildings throughout the country.

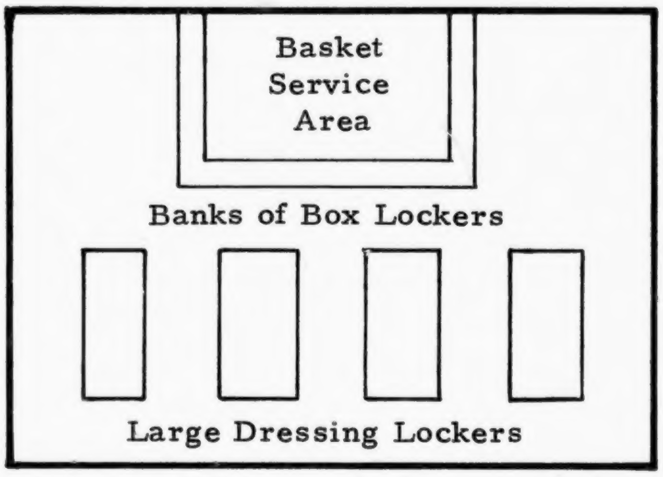
Dressing and Locker Room - The principles of utility and economy suggest that this area be of sufficient size to effectively provide for maximum use, yet should occupy the minimum amount of space necessary for efficient function. Excessive space provision for dressing and locker facilities can mean only the sacrificing of activity areas, an increase in dead space, and the unwise appropriation of funds. The dimensions and arrangement of this room depend upon enrollment in the required physical education program, the extent of the intramural sports program, and the locker plan provided.

The function of this area suggests that it be square or nearly square with a ceiling height of 9 - 10 feet. A layout of this nature lends itself easily to the installation of various locker systems.

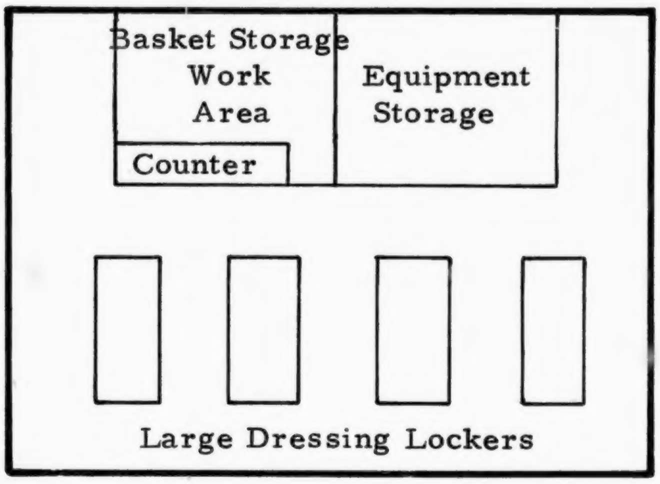
As previously mentioned, there are three common variations of the tote-basket costume storage plan being used extensively in colleges and universities throughout the nation. These plans are referred to as: (1) the "post-office" box locker system, (2) the "attendant method", and (3) the "open rack" system.

1. The post-office plan. - Each student proceeds to his permanent small storage locker upon entering the locker room, removes the lock and carries the wire basket containing his equipment to one of the large vacant dressing lockers. He puts on his gymnasium costume, securely locks his street clothes and wire basket in the dressing locker, and goes to his scheduled activity. Upon returning from the gymnasium or athletic field, the process is reversed.

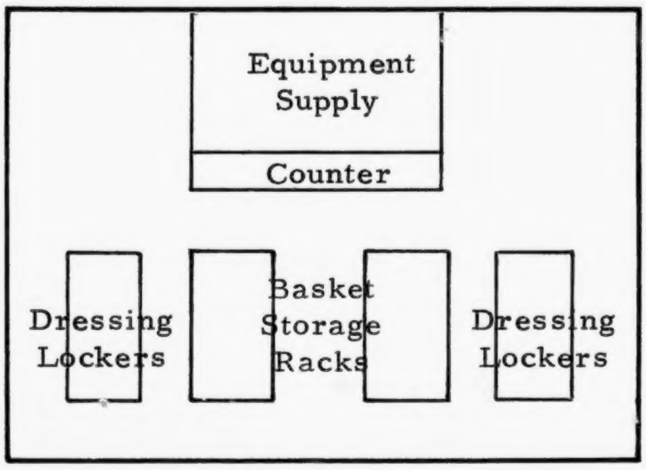
The wire baskets are serviced daily by a supply room attendant who is the only person having access to the rear of the box locker area.



2. The attendant method. - In this system there are enough lockers, full or half-length, provided for a few more than the largest number of persons who will use them at any given period of the day. This includes physical education class members (going and coming), recreational participants, and intramural sport competitors. Each person using the locker room is issued a basket at the start of the year containing a gymnasium costume and towel. These baskets are stored on shelves in a room referred to as the basket storage room. When the student desires his basket, he calls out his basket number at the service counter and an attendant brings it from the racks. He carries the basket to a vacant dressing locker, puts on his gymnasium costume, locks his street clothes and basket in the large dressing locker, and proceeds to the scheduled activity. When he has completed the activity, taken a shower, dressed, and is ready to leave the building, he returns the wire basket to the service counter. An attendant checks the basket, removes soiled equipment, replaces them with fresh articles, and returns the basket to its appropriate compartment in the basket racks.



3. The open rack system. - In this plan the wire baskets are stored in basket racks, and securely fastened in place by means of a lock which inserts through an eye in the basket rack and a similar eye at the top of the wire basket. Each basket and rack compartment have identical numbers placed on metal tags. At the beginning of the year each student is assigned a basket which contains equipment and towel. Upon entering the locker room, he unlocks the lock, removes his basket from the rack, and proceeds to a vacant dressing locker. He locks his street clothes and basket in the larger dressing locker while attending the scheduled activity. After the period has ended, the procedure is reversed.



The basket racks may be either permanently located in the locker-dressing room or they may be placed on wheels and rolled out from a storage room prior to the arrival of each class section.

Although many institutions undoubtedly provide locker storage systems equally as efficient, DePauw University (post office method), the University of North Carolina (attendant method), and the University of Florida (open-rack method) have been selected as possessing outstanding examples of the locker plans mentioned. A description and explanation of the facilities and procedure at these three institutions will offer worthwhile suggestions to authorities in those colleges or universities planning new facilities or planning to revise facilities in use at the present time.

DePauw University

A. Locker and basket provision:

1. Eight rows of 16 double-tier lockers provide 256 locker spaces for storing clothes during peak load.

2. Four rows of box lockers, six rows high, provide 748 compartments for individual mesh wire baskets 13 x 12 x 9 inches. The box locker area is approximately 20 x 20 feet in size.

3. Box lockers are so arranged that students see only the front of the locker area. The supply room attendant is permitted direct access to the rear of all lockers, thereby facilitating ease of service.

4. A heavy wire mesh screen completely covers the top of the box locker area, thus preventing any means of entrance except from the supply room.

5. Heavy wire mesh screens, mounted on sliding

panels, cover the backs of each section of box lockers, thus preventing anyone from outside the area reaching through his box locker and stealing equipment from another basket.

6. Each wire basket is equipped with a metal number tag and a slot for inserting a card on which is printed the name of the owner.

7. An orange-colored metal flag is hung from a hinge at the top and rear of each basket compartment. When a basket has been serviced and placed back in its compartment, the flag is automatically pushed up. When a student removes the basket, uses equipment, and then replaces the basket in his box locker, the flag drops down, indicating to the attendant that the basket should be serviced.

8. Protected lights are arranged over the box locker area to facilitate the work of the locker room attendant.

B. Student procedure:

1. When the student enters the locker room prior to his physical education class, he goes directly to his assigned box locker, unlocks the combination padlock, removes the wire basket containing his equipment, and takes his basket to one of the vacant dressing lockers. After dressing for the activity, he locks street clothes and wire basket in the dressing locker and proceeds to his scheduled activity.

2. Upon returning from the gymnasium or play field, the student showers, places the soiled equipment and towel in the wire basket, places basket in his assigned box locker, and locks the door.

3. During registration week, all student are instructed as to locker room procedure and told how articles of soiled equipment are to be arranged in wire baskets. This makes for greater efficiency of locker room procedure by greatly increasing the speed of basket servicing.

C. Basket servicing procedure:

1. The supply room attendant goes through the basket area each morning, removing those baskets which the orange flag indicates should be serviced. The baskets are placed

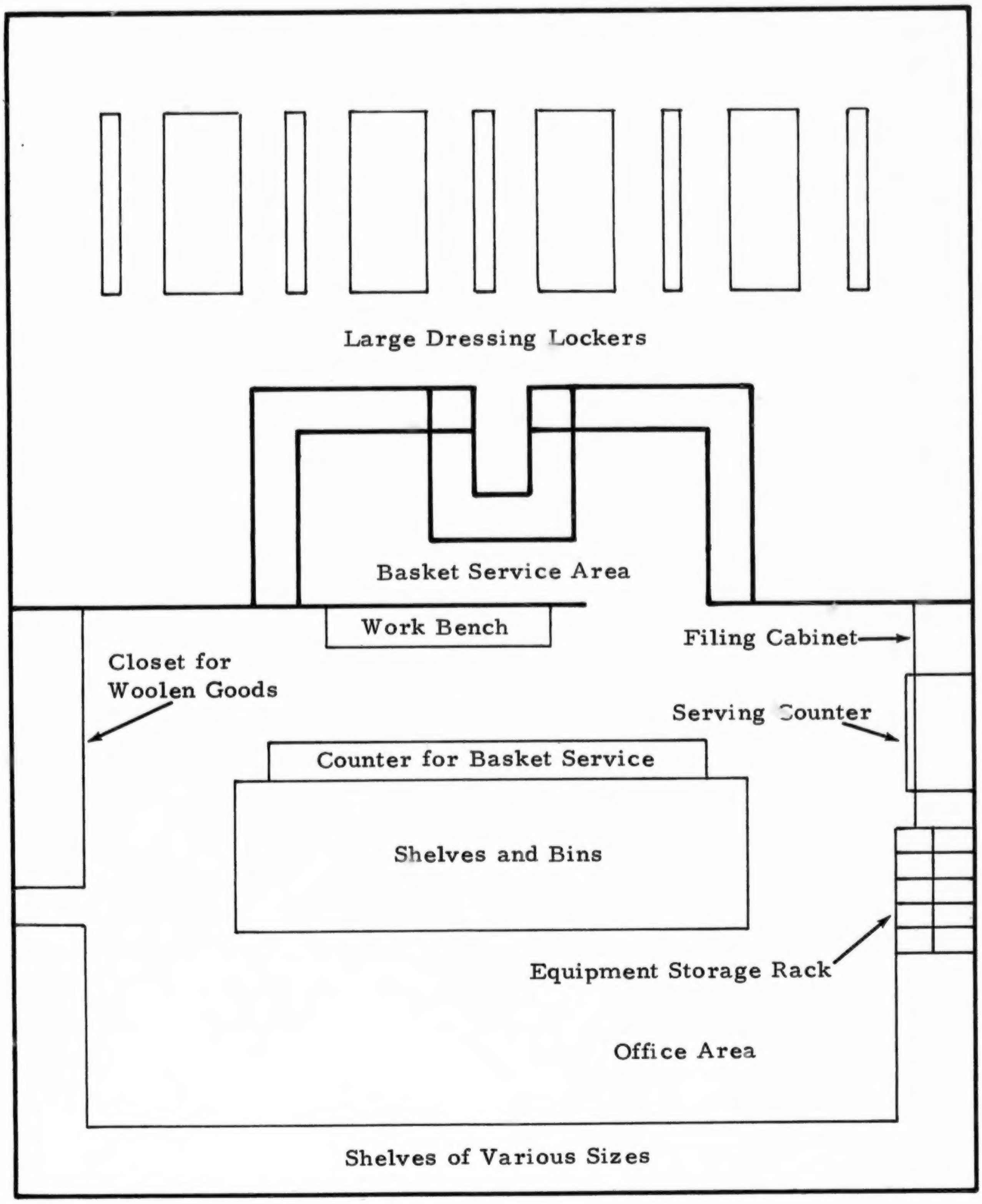

Large Dressing Lockers
Basket Service Area
Work Bench
Filing Cabinet
Closet for Woolen Goods
Serving Counter
Counter for Basket Service
Shelves and Bins
Equipment Storage Rack
Office Area
Shelves of Various Sizes

FIGURE 4. Layout of Locker and Equipment Supply Rooms, Depauw University

on a wooden hand truck designed for this purpose and wheeled to the service counter located immediately inside the supply room door.

2. The attendant removes all basket contents except the shoes, making certain all equipment issued to the students is accounted for. He then refills the basket with fresh equipment from the shelves located above a large working counter. After baskets have been serviced they are again placed on the hand truck and wheeled to the basket area, where they are returned to the correct compartments.

University of North Carolina[1]

A. Locker and basket provisions:

1. The main student locker and basket room is 85 feet, 4 inches x 124 feet in size. Within the room, and occupying a space 100 feet long and 42 feet, 8 inches wide, are 1,000 dressing lockers in two tiers. These lockers are 42 x 15 x 18 inches, mounted on a 4-inch tile covered base.

2. Each tier of lockers rises to within 16 inches of the ceiling, which is 9 feet in height. Sheet metal encloses the intervening space between the upper surface of the lockers and the ceiling, forming a chamber. This chamber is tied in with the ventilating system of the building. The action of the exhaust fans moves the air from the room through the lockers and out through the air conduits.

3. At the north east corner are 131 lockers, each being 76 inches x 15 inches x 18 inches. They occupy a floor area 43 feet, 4 inches x 37 feet 2 inches and are for seasonal or permanent assignment.

4. The service lobby for the basket equipment room is 90 feet long and 14 feet wide. The basket equipment room is 90 feet long and 28 feet, 8 inches wide. It is enclosed with a counter 90 feet long which is separated from the student locker room by a heavy steel wire grille. There are three equidistant service windows in the grille which open to the service lobby.

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[1] C. E. Mullis, "The Tote-Basket System", Reprint from Journal of Health, Physical Education, and Recreation, Dec., 1944.

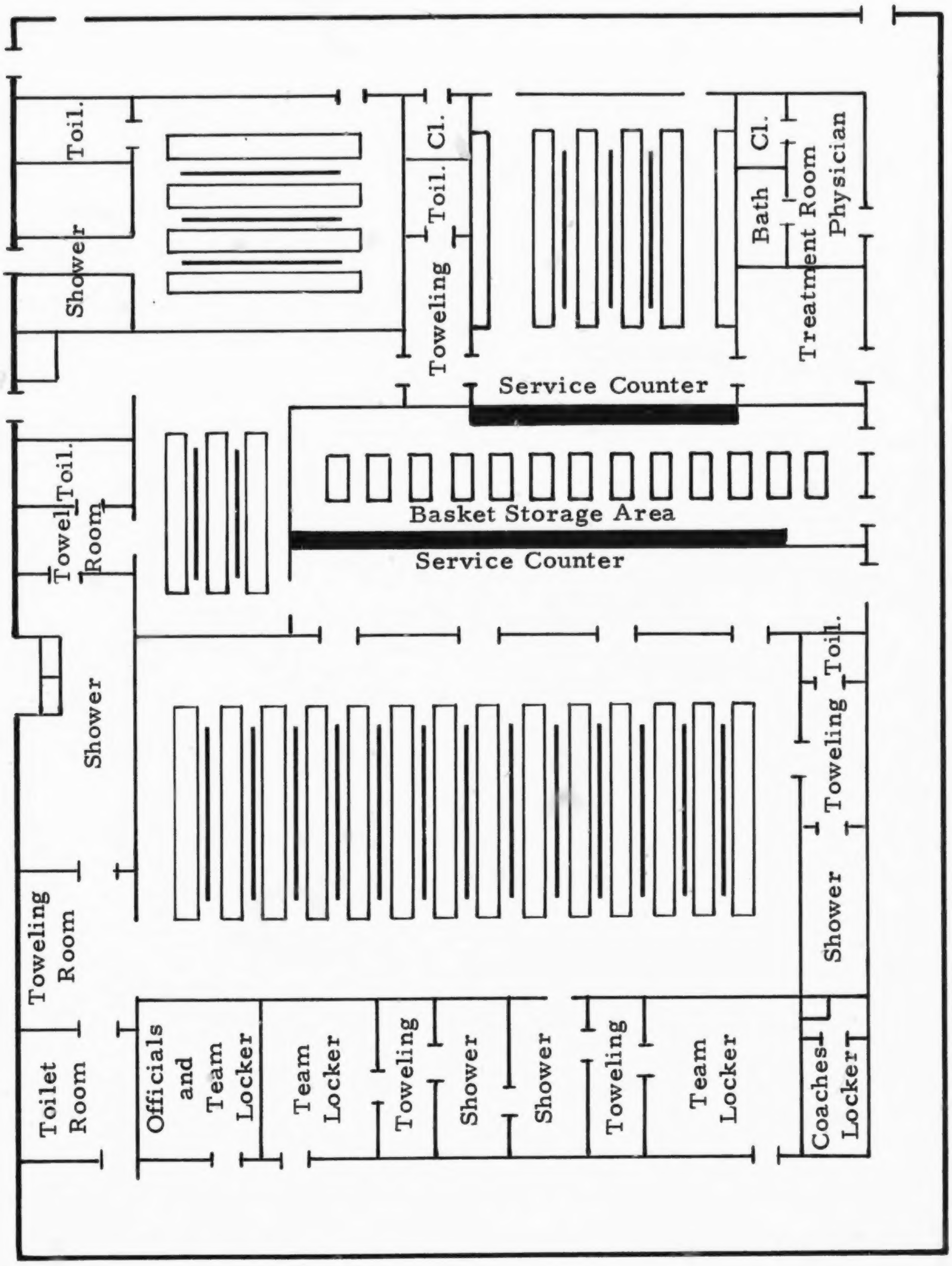
Toilet Room
Officials and Team Locker
Team Locker
Toweling
Shower
Shower
Toweling
Team Locker
Coaches Locker
Toweling Room
Shower
Toweling
Shower
Toil.
Towel Room
Toil.
Service Counter
Basket Storage Area
Service Counter
Shower
Toil.
Toweling
Toil.
Cl.
Treatment Room
Bath
Cl.
Physician

FIGURE 5. Locker Room Floor Layout, University of North Carolina

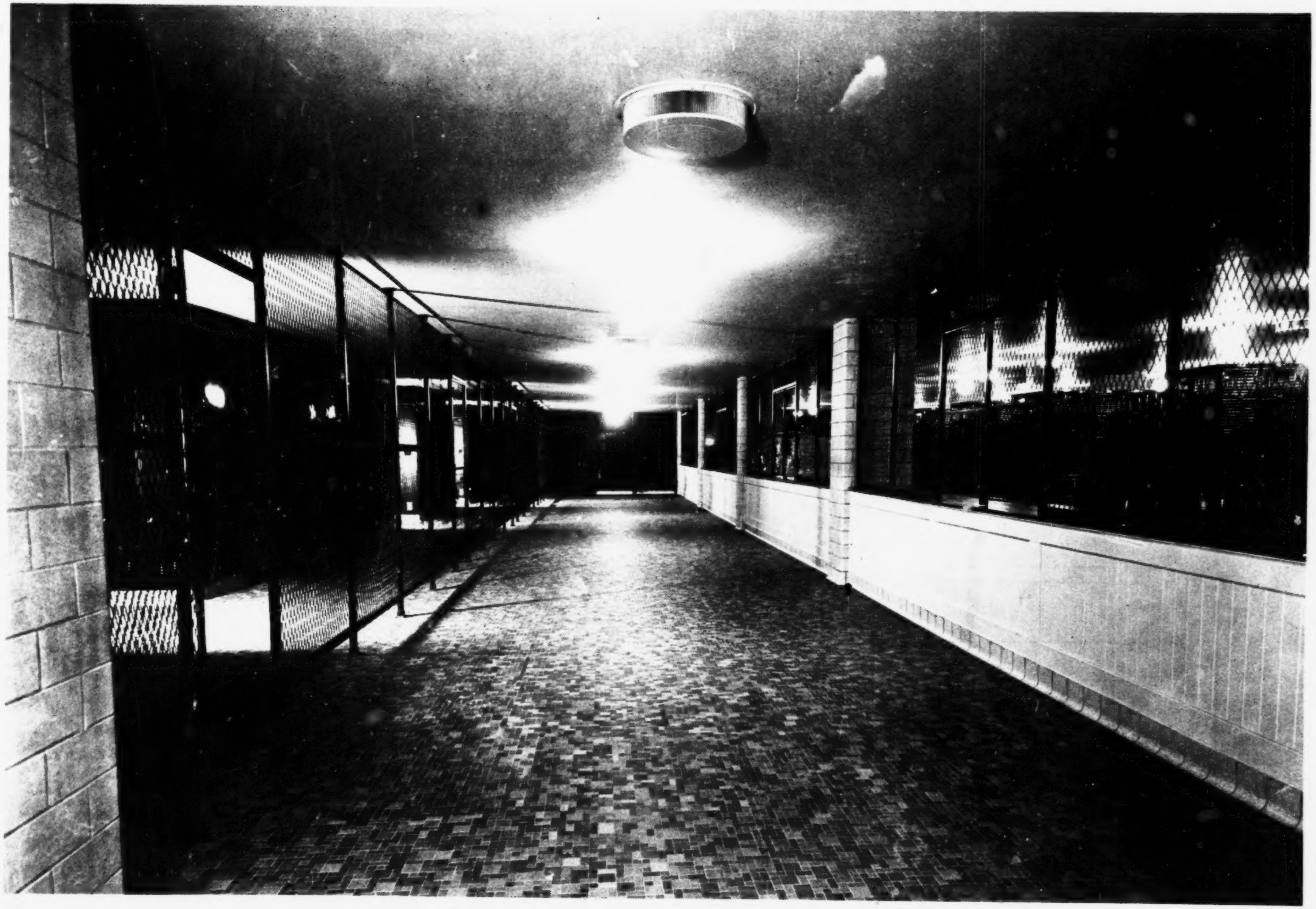

PLATE 10. Main Locker Room, Woollen Gymnasium, University of North Carolina, Chapel Hill, North Carolina. Photograph shows large dressing lockers and basket storage room. Students enter at either end, receive their basket at a service counter, and proceed to a large dressing locker. Heavy gauge steel wire partition permits locking off various areas of locker room as desired.

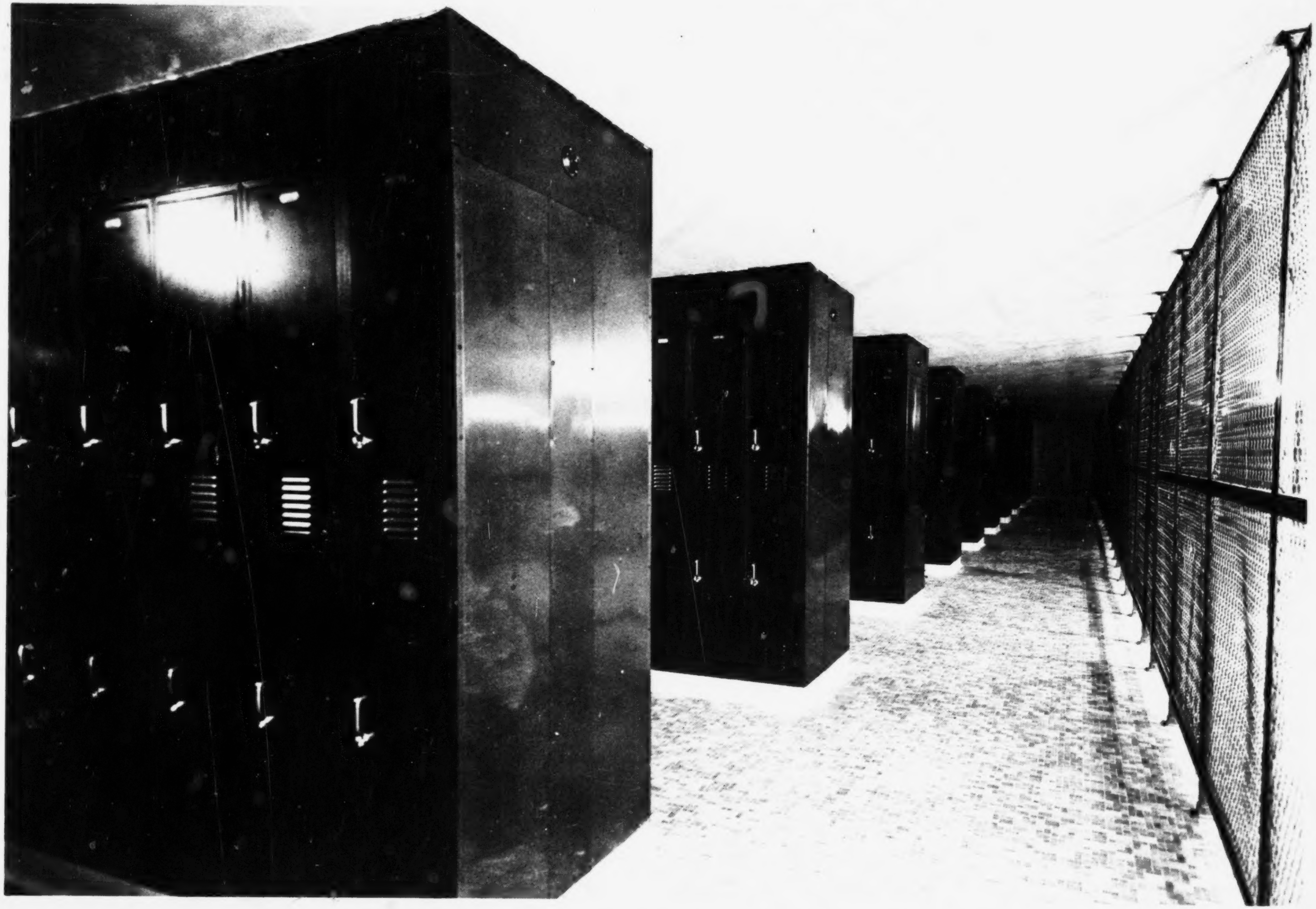

PLATE 11. Dressing Lockers in Main Locker Room, Woollen Gymnasium, University of North Carolina, Chapel Hill, North Carolina. Double rows of half-length lockers are set on concrete bases with coved, glazed tile covering. Locker tops are connected to ventilating system. Floors are of ceramic tile and walls of glazed tile.

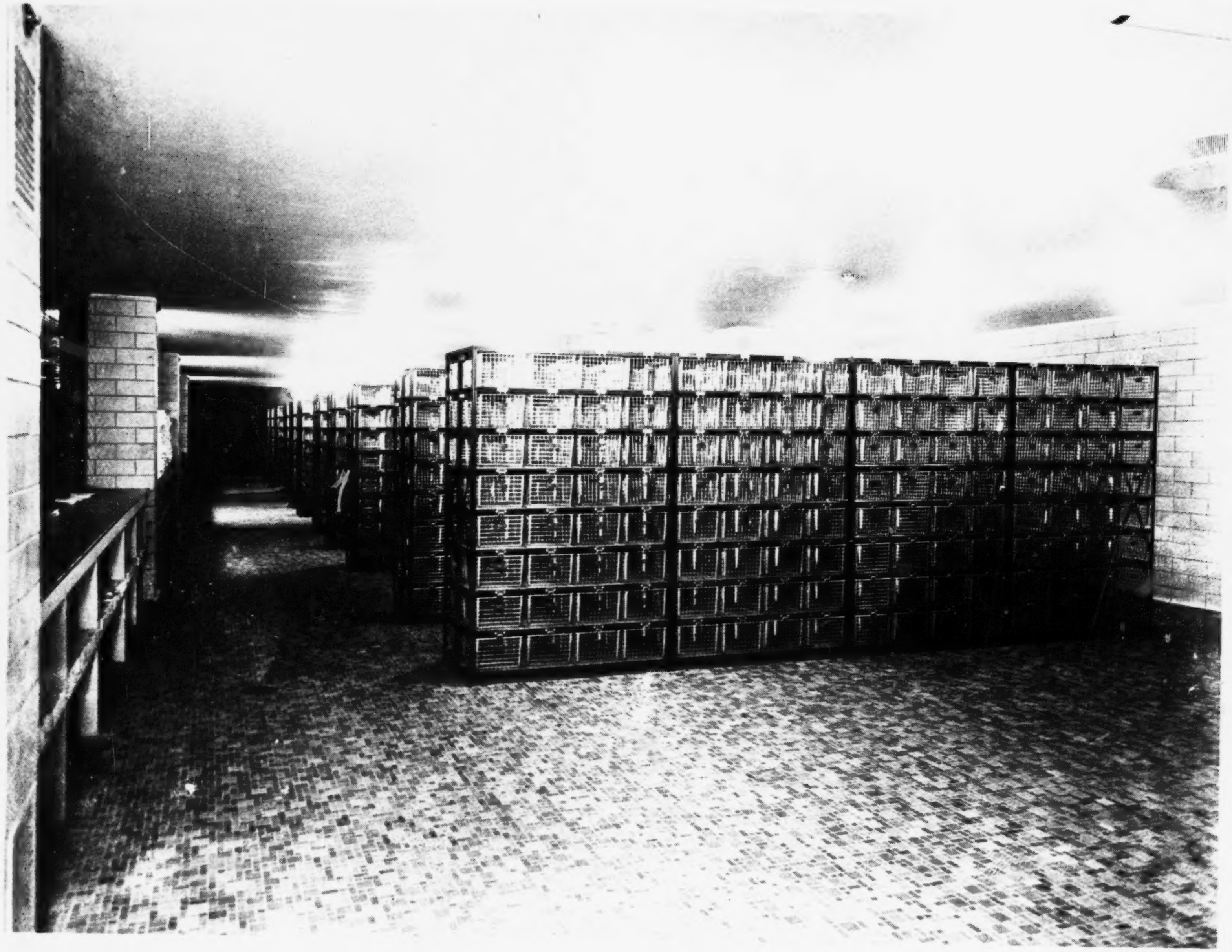

PLATE 12. Basket Storage Room, Woollen Gymnasium, University of North Carolina, Chapel Hill, North Carolina. Double banks of storage baskets, with ends toward service counter, permit basket attendants easy access to all rows. Three long service counters permit handling large numbers of students quickly during peak periods. Storage shelves are provided under counters. Note the ceiling hung heating and ventilation system.

5. The basket equipment room houses 18 rows of 8-tier basket racks, providing adequate storage space for approximately 5, 000 students.

B. Student procedure:

1. Each student is issued a basket at the beginning of the year, containing the following pieces of equipment: sweat shirt, sweat pants, supporter, socks, swimming trunks, and towel. Each basket is numbered and contains a Dudley combination lock. The lock is used to lock the dressing locker in which street clothes and basket are stored during the physical education period. No one has the combination of this lock except the student and the locker room attendant who has a master chart with all combinations and lock numbers listed.

2. Upon entering the locker room, the student goes to the service window above which is marked the range of basket numbers within which his number falls. He calls out his basket number, receives the basket from an attendant, and proceeds to a vacant storage locker. After dressing, he locks basket and street clothes in the dressing locker and proceeds to his activity.

3. When the student returns from the activity, he showers, dresses, places soiled equipment in the basket, and returns it to the service window. An attendant removes all equipment except shoes from the basket, replaces soiled equipment with fresh clothing and towel from shelves underneath the counter, and returns basket to its storage compartment.

The principle criticisms of this method are that at least one attendant must be on duty at all times, and there is likely to be a great deal of confusion around the counter at the beginning and end of each class period.

University of Florida

A. Locker and basket provisions:

1. The main student locker and dressing room is 117 feet long x 60 feet wide, with a ceiling height of 9 feet. Within the room are 500 dressing lockers of the double-tier type and 4, 928 baskets housed in basket racks seven tiers high.

2. The dressing and locker room is so planned that equal locker, basket, shower, toilet, and lavatory facilities are provided at either side of a partial glazed brick partition which runs through the center of the area. It is possible to isolate either side of the room for special occasions by means of telescopic gates at the ends of the partition. Five rows of double-tier dressing lockers and nine rows of storage baskets are provided on either side of the center partition, these set perpendicular to windows and so arranged that a maximum amount of natural light enters between locker rows. In addition to the long rows of lockers and baskets in the center of the area, four double rows of baskets are provided at either end of a centrally located equipment supply cage. All dressing lockers and baskets are of a permanent nature, being set on 4-inch tile-covered concrete bases.

3. A distance of 9 feet is provided between each row of dressing lockers, and a distance of 3 1/2 feet between each row of baskets. A 9 foot area extends from the locker ends to the wall at one side of the area and from locker ends to supply counter on the other side, thereby providing ample room for movement between locker rows and along traffic lines to and from entrances, exits, and shower, toilet, and drying rooms.

4. The 33 x 15 feet equipment supply cage is located centrally along one side of the area, enclosed by heavy mesh wire on either side and a pull-down iron grille at the front. The grille is constructed in two equal sections, either section running on trolleys independent of the other. This arrangement permits one end of the counter to be isolated at times when only one side of the locker room is being used. The counter is 33 feet in length, 2 feet in width, and 3 feet, 6 inches from the floor. Shelves and bins for the storage of towels and gymnasium costumes are provided underneath the full length of the counter.

B. Student procedure

1. Each student is issued a basket at the beginning of the year, containing gymnasium costume and towel. Each basket is numbered and equipped with a Dudley combination lock. The basket and equipment are stored in one of the permanent basket racks in a compartment having the same number as the one on the basket.

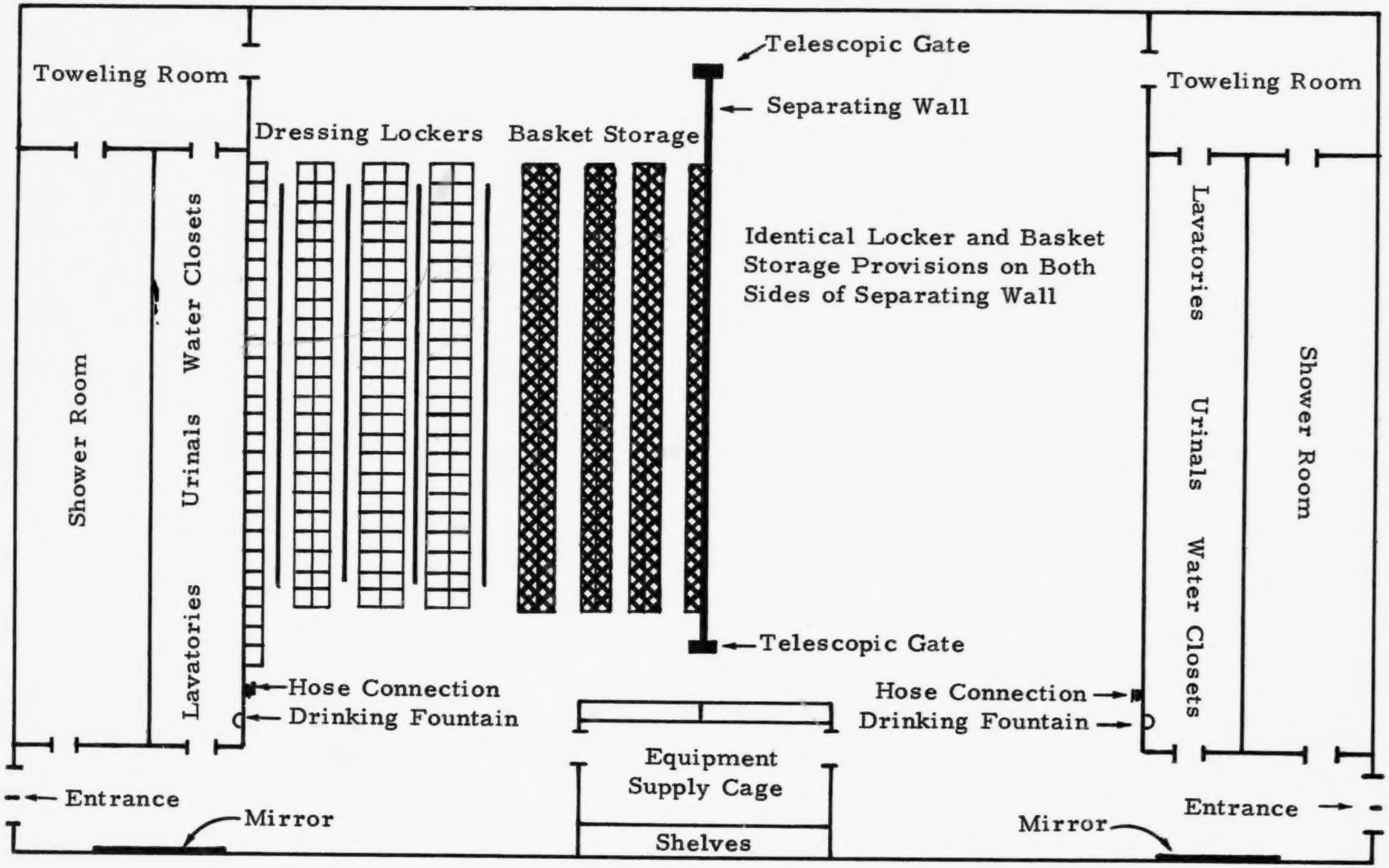
Toweling Room
Telescopic Gate
Separating Wall
Toweling Room
Dressing Lockers
Basket Storage
Water Closets
Urinals
Lavatories
Shower Room
Identical Locker and Basket Storage Provisions on Both Sides of Separating Wall
Lavatories
Urinals
Water Closets
Shower Room
Telescopic Gate
Hose Connection
Drinking Fountain
Hose Connection
Drinking Fountain
Equipment Supply Cage
Shelves
Entrance
Mirror
Mirror
Entrance

FIGURE 6. Layout of Central Dressing and Locker Suite, University of Florida

2. When the student enters the dressing room he proceeds to his basket, unlocks the combination lock, removes his basket and equipment, and carries it to one of the vacant large dressing lockers at either end of the room. After he has dressed in his gymnasium outfit, he locks his street clothes and basket in the locker.

3. Upon returning from the physical education activity, he showers, dresses, and exchanges soiled equipment and towel for fresh articles at the counter. He then places this equipment in his basket and locks the basket in his assigned basket rack compartment.

For obvious reasons, the tote basket plan is superior where large numbers of students must be accommodated. It is (1) economical of space and equipment; (2) provides for using over and over the larger dressing lockers; (3) reduces thievery; (4) provides for increased cleanliness and sanitation; (5) provides superior control and supervision of locker contents; (6) is economical to finance; and (7) provides for adaptability and flexibility in case of future expansion. This is well illustrated by the fact that the basket locker system at the University of North Carolina, originally planned for 3, 000 students, was able to efficiently handle over 5, 000 persons daily during the wartime program.[1]

Regardless of the type locker plan desired, a certain number of large individual lockers will be required. Ideally, full-length metal lockers with baked enamel finish should be installed. In the interests of economy of funds and space, however, the installation of double tier lockers is recommended for physical education and intramural athletics. Full-length lockers should be provided for intercollegiate athletic team candidates.

It is virtually impossible to suggest a formula which would be of any real value in helping plan the number of dressing lockers needed in all situations. For example, a small privately owned college, where enrollment is to be held at a given number, might provide individual dressing lockers for every male student and perhaps 50 per cent of the male faculty. In a large state institution, however, such a procedure would be ridiculous. The large institution, or one in which enrollment is likely to increase, would be wise to plan for one of the box locker or tote-basket systems and install only enough dressing lockers to provide for the peak number who may use the facilities at a given time plus a reasonable number for future expansion.

It is recommended that fixed lockers should stand from 4 to 6 inches off the floor to permit ready cleaning of the floor and to prevent the accumulation of dust and refuse. Many institutions have found it advantageous to place lockers (without legs) on concrete bases. These platforms should have a rounded cove base to facilitate ease of floor scrubbing, and may be planned to permit the installation of double locker rows placed back to back. It is suggested that lockers along walls be recessed. If this is not done, the installation of slanting dust shields on locker tops should be called for in the plans. These serve to prevent an accumulation of refuse and dust. Care must be exercised when platforms are laid to plan their placement with regard for natural and artificial lighting and for normal traffic circulation within the room. Lockers should be arranged in rows perpendicular to the windows so that light will enter between rows. It is equally important that the planning of overhead light fixtures be considered in terms of proper placement in relation to locker bases. The beam of light from fixtures should fall between locker rows rather than on the tops of lockers. Locker bases should be at least 6 feet apart, thus providing adequate dressing space between rows; and in large rooms at least 6 feet should be provided between the ends of rows and walls, thereby permitting freedom of movement to and from showers, toilets, and activity areas.

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[1] Ibid.

Efficient planning considers the hygiene and sanitation of students as well as of the environment. Soiled clothing not only gives off offensive odors but also promotes the spread of disease. No matter what type of locker plan is installed, it will be satisfactory only when accompanied by daily laundry service.

Permanently secured benches are generally more satisfactory than the movable type between locker rows. They should be installed not less than 3 feet from lockers and should provide not less than 18 inches of seating space for each student during the peak load. Where two benches serve opposite rows of lockers and run parallel to each other, a minimum clearance of 20 inches between benches should be sought. It is important that sufficient space be provided between bench and lockers to permit persons walking down the aisle even when lockers are being used.

The layout of the locker and dressing room should be planned with consideration to ease of supervision and the elimination of thievery. In this connection, it is suggested the locker room attendant have a clear view of the entire area from his supply room service counter. It is advisable that his point of vantage be such that he can see between locker rows. The placement of wall mirrors, planned from the standpoint of supervision, may assist in the effective control of the dressing area and locker contents. Entrances and exits should be so located that persons cannot enter or leave the locker room without coming under the surveillance of the attendant.

It is important that tackboard provision be made, since the dressing room is an ideal location for the posting of notices pertaining to the physical education program. The most desirable location within the room is on a wall convenient to the main entrance and exit. A protected light should be placed above the tackboard or a floodlight be focused on the tackboard from the ceiling.

Shower-Drying-Toilet Unit - At least one unit, consisting of shower room, toweling room, and toilet room, should be provided in connection with the central student dressing area. This unit should, by all means, be located on the same floor level and adjacent to the dressing room.

Toilets and lavatories should not be planned as a part of the shower or toweling area, but it is important they be conveniently located for students using these facilities.

Referring again to Figure 6 on page89, which illustrates the layout of locker facilities at the University of Florida, at either end of this central dressing and locker room are located virtually indentical shower, toweling, and toilet rooms. The entrances are so placed that students are routed from dressing area to toilets to toweling area to showers and than back to toweling area, toilets, and dressing room. Cased openings separate all rooms. Separate entrances are provided to the toilets, urinals, and water closets for those students not desiring to use the shower or toweling rooms. All areas are provided with ceramic tile floors, and the side walls of the shower and toweling rooms are of contrasting glazed tile. The toilet room walls are of glazed tile to a height of 7 feet.

The dimensions of the rooms in each unit are as follows:

Drying room - 24 x 15 feet, with a 9-foot ceiling

Shower room - 27 x 12 feet, with a 9-foot ceiling

Toilet room - 27 x 12 feet, with a 7-foot ceiling

The toilet room is arranged so that students entering from the dressing area are routed to urinals and lavatories. If desiring to use water closets, students are routed from water closets to lavatories, then to locker room.

The toweling room is supplied with adequate natural lighting from two large ceiling-height windows of the louver type. In addition, three large light fixtures with metal reflectors are provided overhead. Twenty non-corrosive chrome wall hooks are provided at a height of 5 feet around the walls, these to be used for the hanging of towels when students are in the shower room.

Twenty shower heads are provided in the shower room, running the entire length of both side walls. Shower heads are of the ball and socket type, mounted at a height of approximately 6 feet, and set at a distance of about 3 feet from each other. A recessed tile soap receptacle is placed at a height of 3 feet 6 inches between each two showers. The floor is pitched to drain to the side walls, and a drain is provided for each two shower heads. The top of the cased opening at the floor, between shower room and toweling area, is 4 inches, thereby preventing water draining from showers to toweling area. Adequate lighting is provided in the shower room by means of four large overhead light fixtures, equipped with metal reflectors and vapor-proof shields.

Each room of the shower-drying-toilet unit is equipped with an exhaust fan to draw off vapor and odors from these areas and to improve ventilation. These ventilating fans are located above non-corrosive metal grilles in the ceiling.

Although many institutions have provided foot baths or sprays between dressing and shower rooms, and between shower rooms and natatorium, their use is not recommended as being an effective preventive measure in the control of "athlete's foot" or other fungus infections. The constant use of the foot bath by large numbers of students will soon dilute the solution to the point of inefficiency. Consideration might be given to the use of a copper compound type of floor surface as a means of combatting fungus infection. Such surfaces have proven so effective in reducing bacterial and fungi growth that foot baths and sprays have been found unnecessary.[1]

In view of the moisture laden atmosphere of this unit, it is important that all fixtures be selected and installed from the standpoint of utility and durability. Radiators and heating units should be of copper, brass, chromium plated metal, or other material suited to such an environment. Lighting fixtures should be moisture-proof; it is recommended that luminaires for shower rooms be recessed in the ceiling and covered by a sealed vapor-proof glass or plastic cover. The element of safety requires that all radiators or heating units be either located above reach or recessed in the walls and covered with a non-corrosive metal grille.

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[1] The College Physical Education Association. _op. cit._, p. 24.

It is important that some provision be made for the hanging of towels in the toweling area while students are under the showers. A towel bar of non-corrosive chrome or stainless steel may be securely fastened to one or more walls at a distance of 4 feet from the floor but wall hooks should be at a higher elevation. The University of California at Riverside provides a 6 1/2 foot half-wall between the shower and toweling rooms. Bathers hang their towels over the wall.

Athletic Teams Dressing and Locker Rooms

It is generally agreed that colleges and universities should provide separate dressing, locker, and shower units for local and visiting intercollegiate athletic teams. Although some authorities have advocated that, from the standpoint of promoting more desirable relationships, the home and visiting teams dress in a common area, it is the usual practice to provide a guest room for visitors. The provision of separate dressing areas for athletic teams is further recommended in view of the special equipment required for participation in certain sports.

The number and size of athletic team dressing units will depend upon: (1) the scope of the athletic program, (2) the average number of candidates for teams, and (3) the provision of such units in other physical education structures (field house or stadium).

It is desirable that home and visiting team units be complete within themselves, each including dressing, locker, shower, toweling, and toilet space. A centrally located shower room may well serve the needs of local teams as well as the entire physical education program, but separate dressing, shower, toilet, and toweling areas should be provided for visiting athletic teams.

If football, baseball, track, and basketball team dressing provisions are not included elsewhere, the physical education building should, ideally, provide for the following: (1) two units equipped to accommodate the special requirements of football, baseball, track, soccer and other outdoor athletic squads; one to be used by the varsity, and the other by the freshmen and visiting squads; (2) two units to be used by such smaller groups as basketball, gymnastics, wrestling, and other indoor sports teams; and (3) one unit to be used by faculty members and, on occasion, by visiting teams.

Football Dressing Rooms - Football dressing rooms should, of necessity, be larger than the space provisions for other athletic teams due to the special equipment required and the large number of squad members who must be accommodated.

The location of these rooms should be such as to provide direct accessibility to game and practice fields. Doors should lead directly to the outside, thereby eliminating the necessity of players crossing activity areas or traveling through corridors. The location of these rooms should further be governed by ready communication to the equipment supply room, drying room for equipment, and training room, shower and toweling rooms, and toilets. In addition, building planners should consider the desirability of loading and unloading heavy trunks and equipment required by team travel at the entrance to the dressing room, it being suggested the entrance be so placed that a bus or truck may be loaded or unloaded with the minimum of time and effort.

The arrangement of dressing facilities within the room may vary considerably according to the desires and needs of the particular institution. Some institutions provide large individual lockers arranged around the walls, thereby permitting ample dressing space in the center of the room; others provide double rows of large individual lockers with permanent benches fastened to the floor between locker rows; while still others provide a wooden or non-corrosive metal framework of dressing stalls which extend around the walls of the area. Such a framework should be about 4 feet in height and constructed so that each stall provides a dressing space of approximately 9 square feet.[1] Pegs from which to hang gear are placed at the top of each stall, and a wire shoe basket is located beneath. The advantage of this particular type storage space is that optimum air circulation is possible, thus permitting the drying of equipment overnight.

If lockers are provided, they should be of the full-length type. Consideration should be given the advantages of dressing lockers constructed of hardware cloth, these being superior to metal lockers in that they permit free circulation of air. It is suggested that where individual lockers are provided some type of exhaust system be installed to facilitate drying of equipment.

Aside from locker and dressing facilities, the room should include mirrors, a drinking fountain of the water cooler type, tackboard, chalkboard, receptacles for ankle and knee wraps, a wall clock, and a set of scales.

If a team room equipped with chalkboard, movable tablet-arm chairs, and other equipment needed for instructional purposes is not planned convenient to the dressing room, the arrangement of facilities should be considered with this thought in mind. It may prove desirable to locate dressing lockers around the walls, thereby permitting utilization of the center of the area for group meetings. Such an arrangement would make it possible for players to sit on portable chairs or benches in the center of the room, facing a fixed or movable chalkboard. Football coaches have been loud in their criticism of dressing facilities which prevent a free area for between-halves and pre-game squad meetings.

Auxiliary Team Dressing Rooms - The location of these rooms should be such as to provide convenient access to athletic fields and gymnasium activity areas, shower, toilet, and equipment supply room.

They should be equipped with enough large individual lockers to meet the demands of the number who will use these areas at any given time.

In addition to lockers, the rooms should include tackboards, chalkboards, drinking fountains of the water cooler type, and mirrors. Movable or permanently secured benches should be provided. It is recommended that wall hooks or a movable rack be provided for the hanging of overcoats and suits.

Staff Dressing Room

A separate dressing, locker, shower, and toilet unit should be included for members of the physical education staff and for general faculty use. This area may also serve, on occasion, as a dressing room for visiting athletic teams or for athletic game officials.

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[1] The College Physical Education Association, op. cit., pp. 22-23.

The location of the staff dressing room should be convenient to departmental offices and should provide ready communication to both indoor and outdoor activity areas, class rooms, and the equipment supply room.

A certain number of the lockers in this room should be of the full-length type for physical education instructors and athletic coaches. Others may be of the half-length type. If faculty members are to store such pieces of sports equipment as tennis rackets and golf clubs in their lockers, the 42-inch half-length lockers should be specified rather than the 36-inch size. Many institutions have provided half-length lockers, only to learn the type installed are not of sufficient length to accommodate golf clubs, fencing foils or other sports equipment of this general size.

It is advisable that lockers be arranged around the walls, thereby providing free space in the center of the room for squad meetings, equipment trunks, and gear boxes at times when the room is utilized by visiting teams. If possible, the lockers should be recessed in the walls. The number of lockers required may be determined by figuring the number of staff members plus a few more than the average athletic team traveling squad that will use the facilities. Benches should be provided in front of lockers. These may be of the movable type or may be permanently secured to the floor.

The standards pertaining to surfaces, lighting, heating, ventilation, traffic circulation and auxiliary facilities will be similar in this area to those mentioned as applying to the central dressing and locker suite.

It is advisable that wall hooks or a movable rack be provided for the hanging of overcoats and suits in this room.

The University of Florida's physical education building houses a unique physical education staff-general faculty dressing and shower unit. A separate locker and dressing area is provided for the physical education staff and another for the general faculty. The two areas are separated by a common toilet, shower, and toweling unit. (See Figure 7.) Although such an arrangement of facilities has certain advantages, particularly at a large university, it also possesses disadvantages. The separation of physical education personnel and the general academic faculty eliminates an excellent opportunity for the two groups to meet and become acquainted under informal conditions. There is a general feeling among educational leaders that the separation of various departments in colleges and universities has led to petty jealousies and the forming of "cliques" in both professional and social activities. What better method of promoting harmony and faculty friendships can be proposed than that which provides for joyful intermingling through physical activities and in the informal atmosphere of the locker and shower room?

Women's Dressing and Locker Room

Even if a separate physical education building is provided for women, planning should proceed in terms of those indoor facilities necessary for the successful operation of a co-physical education and co-recreational program. Modern educational philosophy, as expressed in the recommendations of the Third National Conference on Health in Colleges[1], implies the need for curriculum construction with a view toward increasing opportunities for members of the opposite sex to mingle in wholesome physical and recreational activities.

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[1] Third National Conference on Health in Colleges, *op. cit.*, p. 16.

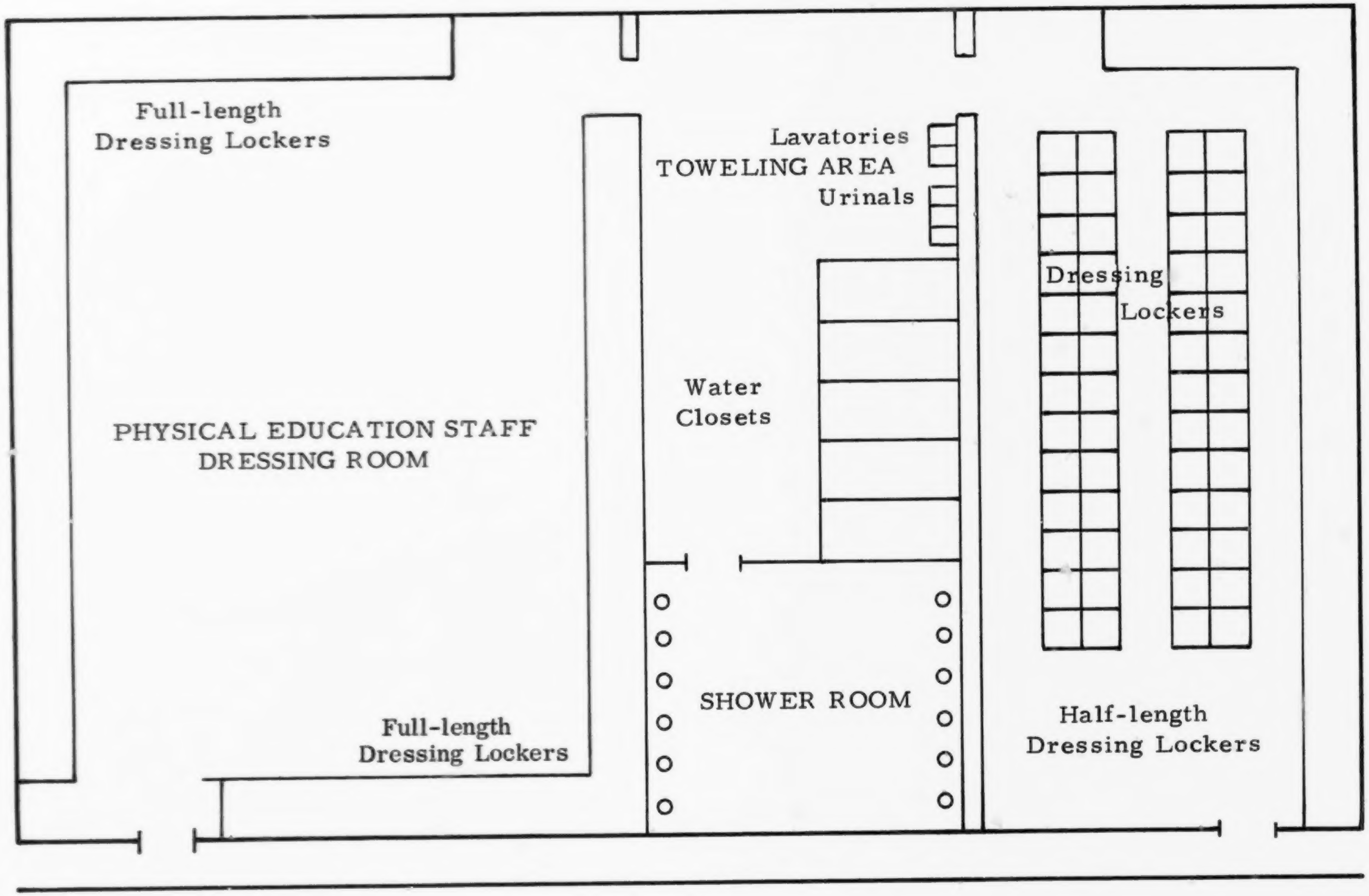
Full-length
Dressing Lockers
PHYSICAL EDUCATION STAFF
DRESSING ROOM
Full-length
Dressing Lockers
Lavatories
TOWELING AREA
Urinals
Water
Closets
SHOWER ROOM
Dressing
Lockers
Half-length
Dressing Lockers

FIGURE 7. Layout of Faculty Locker-Shower-Toilet Suite, University of Florida, Gainesville, Florida

It is both advisable and necessary that a dressing unit be provided in the physical education building for the use of women. In general, the standards for this unit will be similar to those for men. There are, however, certain differences in function that must be considered by the planning group.

The size of this unit will be determined by the scope of the co-physical education and co-recreational programs, and by the average number of persons who will use dressing facilities and equipment at a given time. The location should be determined by accessibility to those areas, particularly the natatorium, which the facilities serve.

Where classes of physical education for women are scheduled in the men's building, the same type locker plan (tote-basket system) is recommended. If facilities are to be used only for recreational purposes, however, it is suggested that full or half-length lockers be provided for the number who will use the room at a given time.

Hair-drying equipment should be considered essential in the women's dressing room, particularly if the area is used in connection with the natatorium. Hair-dryers should be located along the wall in a section of the room not in the line of traffic to activity areas, showers, or toilets. Consideration might be given to the placement of dryers in a recessed area along one wall.

Hair-dryers may be of either the individual or group type. Group type dryers, a series of outlets through which heated air is forced by a centrally located blower, have certain advantages but, everything considered, individually operated dryers are more desirable. The latter may be recessed in the wall, and made as tamper-proof as possible by covering all parts with a metal grille. Only the control switch would be accessible to the user. It is suggested that dryers be placed at sitting level, and that a movable or permanently secured bench be provided for users. Standing-height dryers are not recommended, since these may be improperly installed for the extremely tall or short girl and will necessitate an uncomfortable standing position on the part of those using the dryers.

Sufficient hair-dryers should be provided to accommodate the average locker room peak load of students returning from the natatorium, a suggested ratio being one dryer for every five women.

Ample mirror space is even more important in the women's dressing area than in that of the men. At least four mirrors of approximately 18 x 30 inches, with shelves underneath about 6 inches in width and extending the length of the mirrors, should be located on open walls or at the end of double locker rows. Mirrors preferably should not be placed above lavatories as this tends to create congestion around these fixtures at time of peak load and combed hair tends to clog the traps. In addition to small mirrors, at least one full-length mirror should be provided in line with the exit leading to the corridor.

Women's Shower Room - Although a tendency exists in colleges and universities throughout the country to provide similar dressing, locker, and shower facilities for both men and women students, it would be well to consider the fact that certain women students, who by virtue of family background and nature or personal physical structure, are hesitant to dress or bathe in the presence of others. It is recommended that in the women's area attention be given the provision of a certain number of individual dressing and shower cubicles. Since it will be virtually impossible to foresee the number of individuals who desire separate dressing and shower facilities, persons responsible for planning must arbitrarily determine the number of dressing and shower cubicles

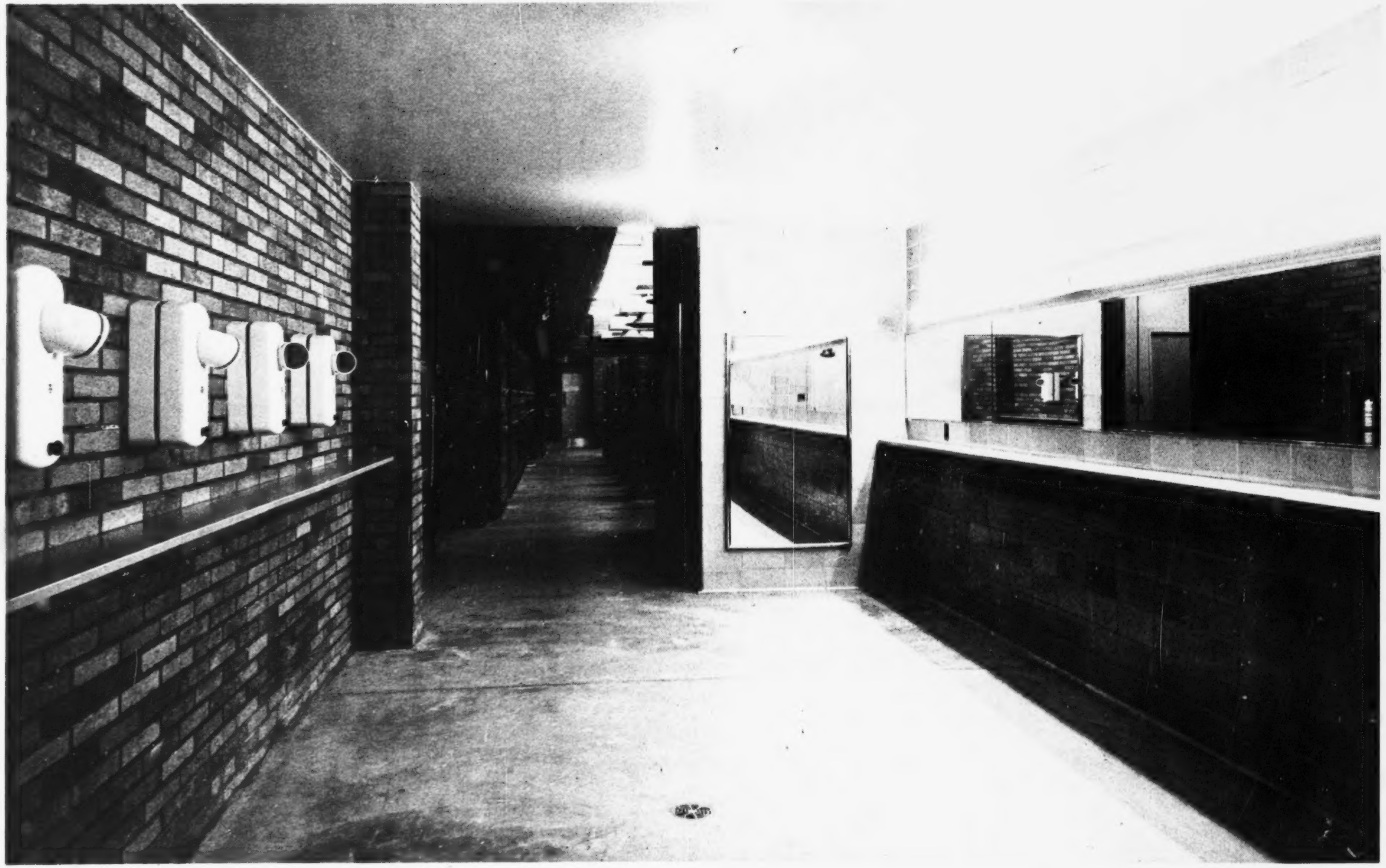

PLATE 13. **Hair Drying Area**, Women's Dressing-Locker Suite, Physical Education Building, University of California, Riverside, California. A separate area for hair drying is equipped with four wall attached, individually operated and adjustable electric dryers. High stools are provided enabling girls to sit in front of dryers. A shelf under dryers accommodates combs, brushes, books and other personal articles. Fluorescent lights are located above mirrors on opposite wall. A full length mirror is provided on wall near exit.

advisable in the local situation. It appears that an appropriate ratio might be 80 per cent gang showers and 20 per cent of the type used in conjunction with individual dressing cubicles.[1] Where dressing cubicles are provided, they should be placed in connection with one another, each having a minimum dressing space of approximately 3 x 3 feet, and each providing direct access to a shower head. The dressing and shower compartments should be separated by either a shower curtain or a non-rusting metal partition, the latter being recommended. Glass shower doors are not satisfactory because of the danger of a bather slipping and breaking the glass. Dressing cubicles should be equipped with a permanently secured bench and adequate non-corrosive clothes hooks. It is highly important that an individual floor drain be provided in each shower compartment, and that care be taken in the planning process to prevent the flow of water from shower compartment to dressing cubicles or other areas of the room.

Lounging Area - Consideration should be given the provision of a lounging area in conjunction with, or convenient to the women's dressing room. Such an area provides opportunity for relaxation after showering and dressing, a convenient place to rest or study between classes, and an informal meeting place for teachers and students.

The lounging area should, ideally, be equipped with easy chairs, a magazine table, a clothes rack and a rack to accommodate books and other personal articles. A pleasant and functional floor surface for this room may be provided by terrazzo or composition floor tile. A recessed clock should be located on one wall. Every effort should be made to promote the attractiveness of this room through the provision of cheerful pastel colors, window drapes, comfortable furniture, adequate natural and artificial lighting, and general cleanliness. The walls and ceiling should be free of such detractions as water and heat pipes.

Employee Dressing-Shower-Toilet Unit

Separate dressing, shower, toilet, and lavatory facilities should be provided for custodial, maintenance, and equipment supply room personnel. These facilities should be located convenient to the equipment supply room and adjacent to office space provided for custodians.

The dimensions of this unit, and the facilities to be included, will be determined by the number of workers employed in the physical education building. A full-length locker should be provided for each person who will use these facilities.

Training Room

There will be need in the physical education building for a room specially designed and equipped for the prevention and treatment of athletic injuries. This area is referred to as the athletic training room.

The training room should be planned in connection with athletic team dressing rooms but not as a part of them. Where possible, the training room should be located to provide direct access from dressing areas. It is particularly important that candidates for athletic teams not be required to travel considerable distance through the building or cross public corridors to reach the training room from dressing areas.

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[1] The College Physical Education Association, op. cit., p. 26.

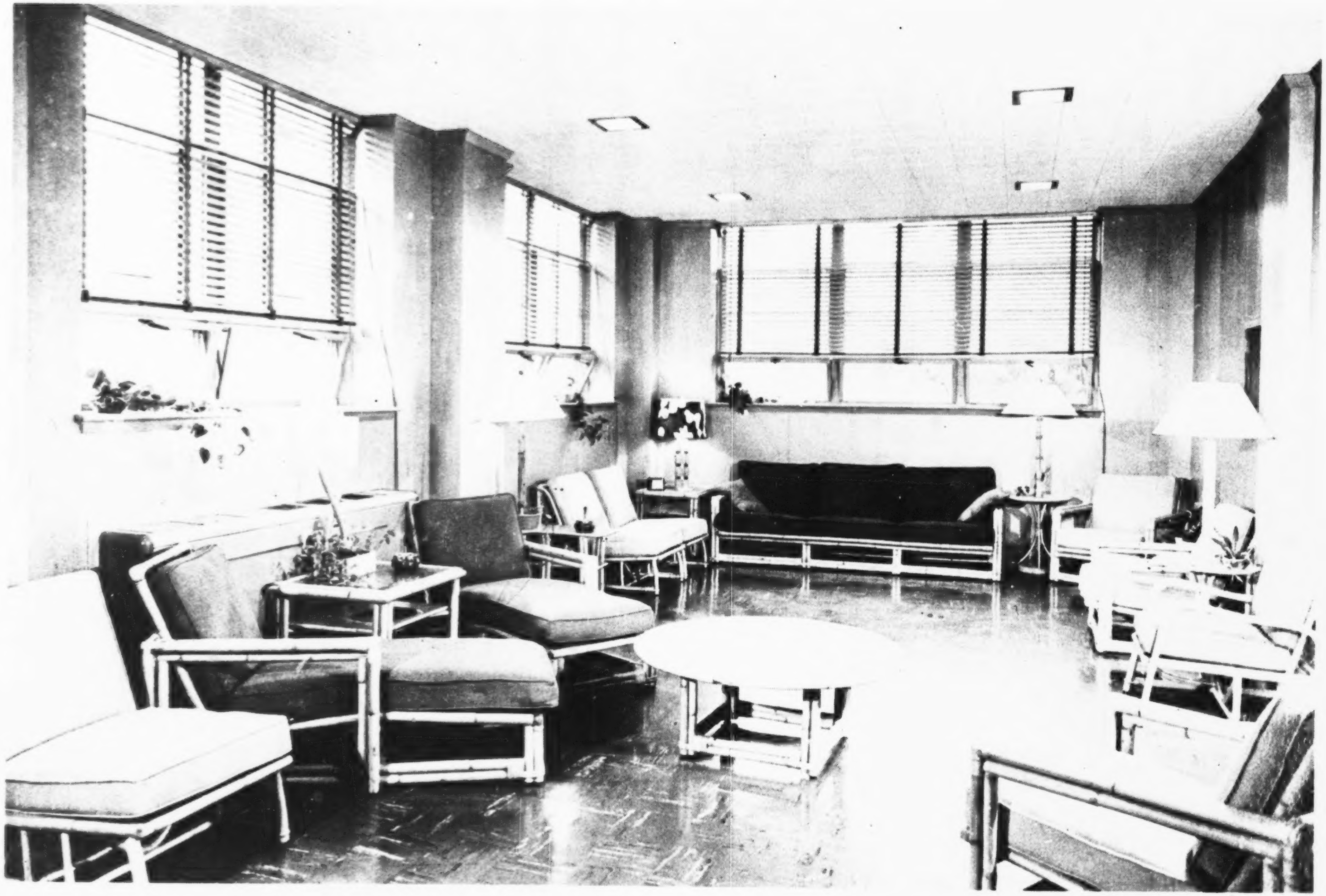

PLATE 14. Student Lounge, Mary Channing Coleman Gymnasium, Woman's College of the University of North Carolina, Greensboro, North Carolina. This functionally planned and attractively furnished room provides a homelike lounging area for students. Features of the room include asphalt tile floor, large windows equipped with ventian blinds, acoustic tile ceiling, and light fixtures recessed in ceiling.

The training room should be of sufficient size to provide uncrowded work space for athletic trainers and to accommodate the present and possible future equipment to be included in the area. The amount and kind of equipment provided should be determined by the extent of the athletic program, the relative location of the health service, and the availability of funds. Where the health service is located in the physical education building, there is no need for duplication of certain expensive apparatus. Bilik[1] lists the following as being minimum training room equipment:

A surgical cabinet

One or more massage tables

Sponge rubber pads for massage tables

A whirlpool bath

An ultra-violet (cold quartz) lamp

A deep therapy baking lamp

Two or more therapeutic lamps -- floor models

Two or more portable therapeutic lamps with clamps for attachment

Two electric pads

One gymnasium scale, floor model

An army-type stretcher

A benzoin bench

A short-wave diathermy

Waste cans, towels, sheets

A desk and chairs

An assortment of antiseptics, liniments, astringents, ointments, tape, gauze, and protective pads

The arrangement of facilities and equipment should be specified only after a thorough analysis of the athletic trainer's functions, and after consideration of typical traffic circulation within the training room area. Cramer and Boughton[2] list the duties of the trainer as follows: (1) prevention of injury, (2) superficial first aid, (3) protective bandaging and taping, (4) electrotherapy and hydrotherapy treatment, (5) stretching exercises, and (6) psychological contact between the coach and the athlete.

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[1] S. E. Bilik, The Trainer's Bible, New York, T. J. Reed and Company, 1946, pp. 359-371.

[2] F. Cramer and L. L. Boughton, A Training Room Manual, Garaner, Kansas: Cramer's of Garaner, Kansas, 1945, p. 3.

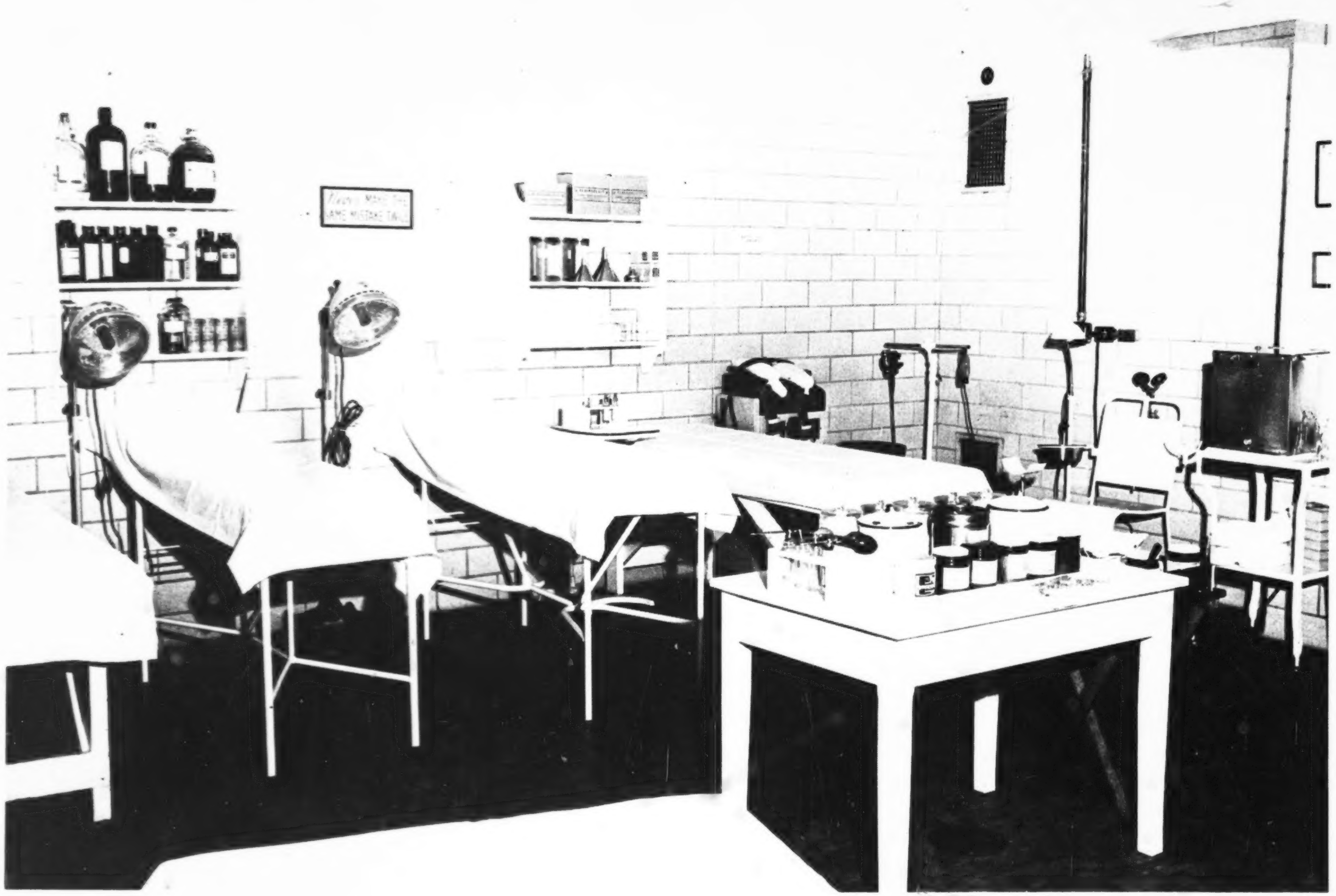

PLATE 15. Athletic Training Room, Woollen Gymnasium, University of North Carolina, Chapel Hill, North Carolina. Courtesy of University of North Carolina. Walls are of light glazed tile; floor of ceramic tile. Electric outlets provide various voltages for equipment. Tables and chairs are adjustable. Note wall hung storage shelves for supplies near tables.

The majority of students that come to the training room for attention can be grouped in five distinct categories: (1) those who merely desire such small articles as a band-aid, a piece of tape, an ace bandage, or a protective pad; (2) those who have blisters or fungus infection on the feet; (3) those who have suffered minor bruises, strains, or sprains; (4) those who have received abrasions or lacerations; and (5) those who have suffered rather severe injuries requiring extensive taping, bandaging, or the use of electro-therapy and hydrotherapy apparatus.

For purposes of promoting efficient dispensing of small articles and reducing traffic within the training room, a wall opening and serving counter between the locker room and training room should be provided. An assistant to the trainer can dispense these small articles, thus freeing the trainer for other duties. Shelves for the storage of immediate supplies should be located underneath the counter or along the wall convenient to the supply window.

To readily accommodate those persons having foot blisters, athlete's foot, and those needing ankles or knees taped, it is suggested that a benzoin and powder bench be provided along the wall immediately inside the entrance. If only powder or benzoin is needed, the student will apply this and then proceed from the room through a convenient exit to the dressing area. If taping is to be done, he will apply benzoin to the ankle or knee to be taped, spread powder over the benzoin, and proceed to the taping tables. These tables should be located in the center of the room and convenient to the benzoin bench. Rubber floor runners should extend across the area between the benzoin bench and taping tables, thus preventing discoloration of the floor surface. After being taped, the student will proceed to the exit. Some trainers prefer to have the powder bench located along the wall immediately outside the training room, thus reducing traffic in the room.

A special area for care of lacerations and other injuries requiring surgical treatment of a physician should be located along a wall convenient to the entrance. This location is important for three reasons: (1) the injured person should reach the area for treatment as quickly as possible; (2) if the injured person is bleeding, he will not leave a trail of blood the length of the training room; and (3) other activities in the room will not be disrupted as they would be if the surgical area were at the rear of the room.

In many instances, the functions of the trainer will include treatment of severe bruises, strains, and sprains requiring prolonged use of electrotherapy and hydrotherapy apparatus. For these functions, it is suggested that special areas of the room be designed. Since there will be relatively few athletes requiring such treatment, as compared with those needing only a short period of attention, the areas designed and equipped for this purpose should be off the normal traffic route, preferably at the far corners of the room. It is essential that these areas be along the walls, since wall connections will be necessary for the apparatus and equipment to be used.

The area planned for electrotherapy treatment should include two or more padded training tables, space for various types of electrical apparatus, and conveniently located electrical outlests. An overhead trolley arrangement for heat lamps may be provided, thus increasing the functional utilization of available floor space. The electrotherapy area should be convenient to storage shelves and work table.

It is suggested that a small separate room be provided for hydrotherapy treatment, or that the area be isolated from the training room proper by means of a wall partition. This is necessary because of the special requirements involved. The standards for floor, wall, and ceiling should be similar to those suggested for shower rooms. The area should contain at least one whirlpool bath with through-the-wall water attachments; electrical outlets; floor drains; a shower stall equipped with floor drain, curb, and shower curtain; and a shelf or cabinet for storage towels. The floor should be pitched to drain toward side walls. A shower stall is recommended in the hydrotherapy area since, in certain treatments, the individual must wash and towel himself prior to emersion in the whirlpool bath. The convenient shower stall eliminates the tracking of water across the training room floor and saves time for both the student and the trainer.

Additional space should be provided in both the electrotherapy and hydrotherapy areas for possible future expansion. New and improved apparatus are being constantly perfected and made available.

The ideal training room should be light and cheerful. It should be well ventilated. A temperature of 78° F. should be maintained. An exhaust fan is necessary in the training room and the hydrotherapy area to eliminate excess moisture and offensive odors.

Office space for the athletic trainer should be provided convenient to the entrance and to the dispensing window. This area should contain a desk, chairs, filing cabinet, and locker. It is important that a telephone be included, since this will permit ready communication with other offices and areas of the building or campus without the necessity of the trainer leaving his work area.

The efficient trainer will order needed supplies and equipment on a long-range basis rather than by a weekly or monthly plan. Some economy is achieved when supplies are purchased in large lots. For purposes of storing these supplies, a storage closet should be provided in or adjacent to the training room. The storage closet should contain shelves extending to the ceiling, and these shelves should be planned in terms of the specific supplies to be stored. The first shelf should be approximately 28 inches from the floor, as this will permit the functional storage of two 12-inch cans of tape placed one on top of the other.

For purposes of storing those immediate supplies used daily by the trainer, and to provide a convenient work counter, it is suggested that storage shelves extend along the entire wall at the far end of the room from the entrance. These shelves should run to a height of approximately 4 feet, and the top shelf should provide a working area for the trainer of approximately 2 1/2 feet from the outer edge to the wall. A provision of this nature, as illustrated in Figure 8, will be convenient to the trainer from the three areas of the room in which he will normally work. An additional storage area for immediate supplies should be provided near the dispensing window.

The floor of the training room should be easily cleaned, comfortable for bare feet, water resisting, and of a material which will not be permanently discolored by iodine, benzoin, or other solutions commonly used in the area. It is suggested that the floor be light gray, tan, or green. Persons should not be permitted to wear cleated shoes in the training room except in case of emergency. In view of this fact, the floor should be of a material which will not readily crack, chip, splinter, scratch, or become indented.

Lower wall surfaces preferably should be of glazed tile or brick to prevent disfiguring. Upper walls and ceiling should be moisture resisting and painted a light, cheerful color. Many trainers have expressed a preference for pastel green rather than white. The ceiling should be approximately 9 feet high as it will oftentimes be advantageous for the trainer if the athlete stands on a training table while having ankles or knees treated. The height of the average training table is 30 inches, but this may vary according to the height of the trainer.

All electrical outlets should be placed in the walls above, rather than in the

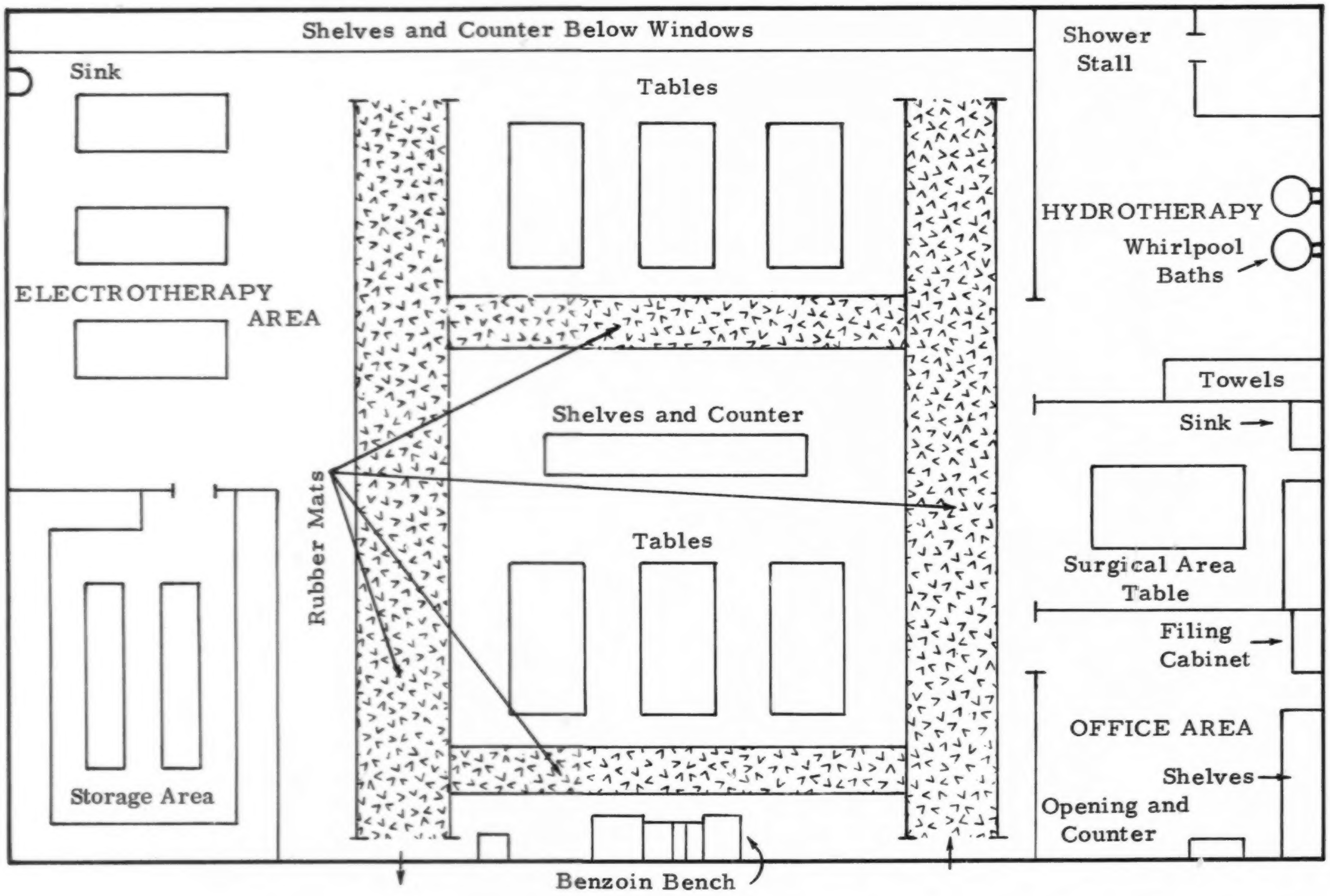
Shelves and Counter Below Windows
Sink
ELECTROTHERAPY AREA
Storage Area
Rubber Mats
Tables
Shelves and Counter
Tables
Benzoin Bench
Shower Stall
HYDROTHERAPY
Whirlpool Baths
Towels
Sink
Surgical Area Table
Filing Cabinet
OFFICE AREA
Shelves
Opening and Counter

FIGURE 8. Suggested Layout of Athletic Training Room

baseboards. The ideal height for wall plugs in the training room is about 4 feet from the floor. Floor plugs present a hazard in this area. Since certain electrotherapy apparatus do not operate on the amount of voltage usually provided under ordinary circumstances, this fact should be considered in the original building plans. Where electrical outlets are provided for increased voltage, these wall plugs should be plainly marked.

Adequate illumination, both natural and artificial, should be provided in the training room. At least one window should be included in the hydrotherapy area. The windows should be placed at a height of approximately 5 feet from the floor. Overhead light fixtures should be sufficient to provide a minimum of 40-60 foot-candles of artificial light throughout the room, and it may be desirable to provide increased local lighting over certain areas, such as the station where cuts and abrasions will be treated.

Equipment Supply and Storage Rooms

The efficient functioning of the college or university physical education and athletic program depends to a large extent upon the provision, location, and operation of those rooms from which equipment is distributed to students and faculty members and in which equipment is stored when not in use. Failure to adequately consider these areas in the original building specifications can only result in a makeshift arrangement leading to administrative problems.

The equipment supply room is considered here as an area devoted to the storage and distribution of such expendable articles as towels, uniforms, balls, bats, gloves, golf clubs, and archery tackle. If the tote-basket locker plan is employed, the room may be used for the storage of baskets. Space provision should also be provided for the equipment necessary for the repair of gear used in the physical education program.

The equipment storage room is defined as an area devoted to the more or less permanent storage of such equipment as athletic uniforms, football line markers, chairs, toboggans, skis, archery tackle, and other seasonal sports equipment.

The function of these rooms suggests their location on the same level and convenient to dressing and locker areas. Ideally, the equipment supply room should be adjacent to the central dressing and locker area and the equipment storage room should be connected to the supply room, with a door at least 4 feet wide providing direct access to the storage area for the supply room attendant. Where the "post office box locker" plan is employed, the equipment supply room should be so located that direct servicing of baskets is possible.

Consideration must be given the location of equipment rooms in relationship to ease of handling delivered equipment and supplies. If located on the ground level, double doors from the storage room should enter directly onto a concrete loading platform. Ample space should be provided for delivery trucks to back in and maneuver about. There should be a ramp from the driveway to the loading platform to accommodate hand trucks. If the supply and storage rooms are located in the basement or above the first floor, an elevator should open onto the loading platform.[1]

In view of the great monetary value of equipment stored in these rooms, more than casual attention should be given to fire and burglar protection. It is suggested that doors be of a durable metal construction, and that locks be of good quality. It might be advisable to provide additional burglar protection by means of sliding or swinging heavy-gauge wire mesh screens on the inside of all exterior doors and windows. The surfaces of these areas should be of fire-proof material, and the ceilings preferably equipped with automatic sprinklers.

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[1] The College Physical Education Association, op. cit., p. 29.

Equipment Supply Room

The size of this room will depend upon student enrollment, the extent to which physical education costumes and equipment are issued, and the type of locker system employed. From the standpoint of function, it is suggested that the room be square or nearly square rather than long and narrow. A minimum size of 600 square feet is suggested.

Floor surfaces may be of any material which is durable, easy to clean, and attractive. Rubber runners between storage shelves and along the floor area in front of the serving counter provide a non-skid surface and, also, promote walking ease for the supply room attendant.

Metal shelves should extend to the ceiling on at least three sides of the area. Traveling ladders should be provided, thereby enabling the attendant to reach equipment stored on upper levels without the necessity of climbing shelves or "fishing" with a pole. All shelves and bins should be equipped with metal tag containers in which tags can be inserted, listing the equipment and sizes to be stored. It is suggested that shelves containing socks, supporters, and other small pieces of equipment be located at lower levels, and be equipped with a partial front partition, thus creating a bin-like effect. This is necessary to permit ease of service and to prevent articles from constantly spilling out on the floor.

In addition to the provision of shelves around the walls, it is advisable that racks of shelves be located in the center of the room, with compartments easily accessible to the attendant from his station at the counter. The center storage shelves may be mounted on rubber castors, thus enabling the attendant to move the equipment to any area he desires. Shelves and bins should also be provided underneath the serving counter. The storage space in the center of the room and beneath the counter should accommodate those articles such as towels, uniforms, balls, bats, and other equipment being constantly distributed to students and faculty members. It is vitally important that these articles be stored convenient to the serving counter in order to facilitate the work of the attendant and to speed the movement of lines at the counter.

Racks for golf clubs, archery tackle, tennis, badminton and squash racquets, and equipment of a like nature should be located convenient to the service window. Such racks should be built against the wall so they will not present an obstruction to the movement of those persons working in the room. It is important that the attendant be able to quickly distribute and receive such equipment without having to secure or return it to a storage rack in another room.

Suitable bins or receptacles should be provided for the collection of soiled towels, socks, supporters, swimming trunks, and physical education uniforms. If these articles are received and distributed over the serving counter, the receptacles should be located within easy reach of the counter. Many colleges are now providing an equipment drop in the counter -- this being a sliding metal panel on which soiled equipment is placed. The attendant, after checking the equipment, can release the drop panel by a foot treadle and the soiled articles drop into a laundry bin without being handled by the attendant. Where the "post office box locker" system is used, the receptacle should be located at the station where baskets are serviced.

Many institutions operate their own laundry service. If this be the case, and the laundry is located on a lower level, planning should consider the provision of laundry chutes located within easy reach of the counter or service station. Where towels and uniforms are sent to a commercial laundry, it is recommended that a set of suspended scales be located where soiled articles are gathered, thereby permitting a quick and accurate record of the weight of all articles sent out.

If the basket system is employed, there should be provided a rack or shelves located convenient to the basket service area. This permits the storage of baskets which have been "pulled" as a result of missing pieces of equipment, a student withdrawing from school, or other irregularities in the established locker procedure.

It is desirable that either this room or the equipment storage room be provided with a long working counter along one wall. This should be approximately 30 inches wide and 3 feet above the floor. To conserve space, shelves or drawers should be provided beneath this counter.

For purposes of distributing and receiving equipment, at least two service windows should be provided. These should enter directly into the central dressing and locker room. The service window should be large enough to permit the passage of all equipment issued and should be equipped with a metal door or screen which can be closed and locked from the inside. At each service window there should be a service counter approximately 3 1/2 feet from the floor and 3 feet wide. The surface of this counter should be of metal, formica, or hard-finished wood, and should present a smooth, unobstructed area for the distribution of equipment. The counter should extend into the supply room rather than into the dressing area.

It is imperative that the equipment supply room be equipped with sufficient electric outlets, a telephone, tackboard, desk, key rack, first-aid cabinet, and filing cabinet located convenient to the service counter. A tackboard for the purpose of posting notices to students pertaining to equipment and locker room procedure should be located outside the service window.

As previously mentioned, it is desirable that the service windows be so located that the supply room attendant is permitted a full view of the dressing and locker room interior. This is advantageous from the standpoint of supervision and the reduction of thievery.

Some institutions have provided a single long service opening with a counter extending the entire length of the opening. A pull-down heavy-gauge wire mesh screen, which rolls into a case at the top of the opening, makes it possible to isolate the supply room from the dressing area. The University of Florida provides a locker and supply unit where either side of the dressing and equipment supply room can be isolated by means of a telescopic gate and two pull-down grilles. A serving counter extends the entire length of the equipment supply area. The University of North Carolina provides a similar type service counter, but a permanently secured heavy mesh wire grille separates the dressing room from the supply room. Three equi-distant serving windows are provided for students .

Equipment Storage Room

The equipment storage room should be of sufficient size to provide adequate storage of equipment and supplies and, at the same time, possess enough open space in the center of the room for the easy movement and handling of equipment. A ceiling height of at least 9 feet is recommended.

Adjustable shelves of at least 2 foot depth should extend to the ceiling on at least two sides of the room, each shelf being clearly marked with tags indicating the articles to be stored. In order to facilitate ease of handling equipment on higher shelves, traveling ladders should be provided.

Moth-proof closets of sufficient size should extend along one wall for the purpose of storing team uniforms during the off season. A metal or wooden rod should run the

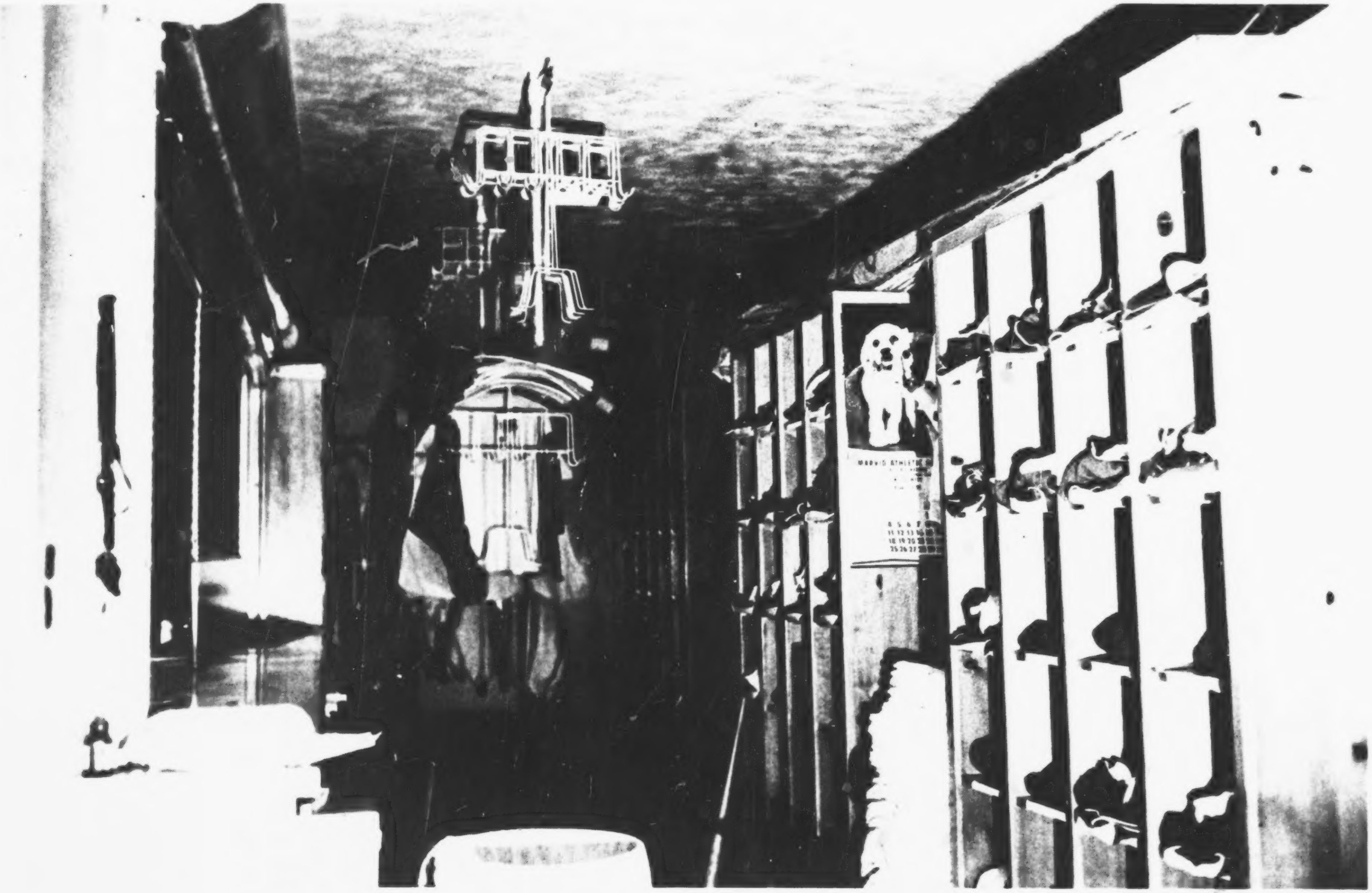

PLATE 16. Athletic Team Equipment Supply Room, Bakersfield College, Bakersfield, California. Courtesy of Bakersfield College. Team uniforms are hung on specially constructed hangers near serving counter. Storage shelves with individual compartments for accommodating game equipment are located behind window opening, with compartments marked with players' names. A garage-type pull down metal partition is installed above serving window and counter.

entire length of the closet so that uniforms may be neatly hung. The clothes rod should be of sufficient height to prevent uniforms from touching the floor. Closet shelves should extend to the ceiling, these being provided for storage of blankets and other woolen goods.

Shoe racks for the storage of footgear of all sports should be constructed along a wall, these being plainly marked as to the sizes to be stored in each compartment.

Movable helmet racks may be provided in this room for the storage of football helmets, or separate compartments may be constructed for this purpose. Some institutions handle the problem of storing football helmets and shoes by hanging them from a wooden bar or pole which may be pulled up to a height of 8 or more feet, thereby conserving storage and working space in the area. Unless the equipment storage room is kept at a reasonable low temperature, it is suggested that leather gear not be stored at higher levels in the room since heat will accumulate near the ceiling and may dry and crack shoes, helmets, and shoulder pads.

Racks should be provided for the storage of trunks and gear boxes used when athletic teams travel to other institutions. This factor should be considered in the original plans for the room in order that such space provision will not be overlooked when shelves are constructed.

A work bench should be provided if equipment repair is to be done in this area. The bench should be of sufficient width and strength to accommodate such machines and tools as are necessary in equipment repair. Electric outlets must be planned according to the location and number of machines installed. The storage room should also be equipped with a deep sink with hot and cold water.

Since athletic sports equipment and gear may be issued from this area, it is important that a service opening and counter of similar standards to those of the supply room be provided. A metal filing cabinet should be located adjacent to the service counter for the filing of cards and reports pertaining to equipment issued and received. A tackboard for the posting of notices should be located on the wall both inside and outside the service window.

The heating and ventilation of this area is of the utmost importance, since the humidity and temperature must be maintained at a constant level for ideal equipment storage conditions. A constant temperature of approximately 65-70 degrees is suggested.

Athletic Equipment Drying Room

A separate room should be provided for the drying of athletic team uniforms. This should be adjacent and directly accessible to varsity locker rooms and the equipment supply room.

It is suggested that rust-proof racks be installed in rows across the room for the purpose of hanging jerseys, pants, and other athletic gear. Each rack should be equipped with number tags which correspond to the numbers of lockers in the varsity locker rooms or the jersey numbers of players. The racks should be of sufficient height to permit the hanging of articles without their dragging on the floor. It is important that racks be equipped with clothes hooks and hangers of a non-rusting material. Movable racks may be provided rather than those of a stationary type, thus enabling them to be rolled from the dressing area to the drying room.

Radiators or heating units in this room may be located around the walls but they should be placed at a height sufficient to prevent accidental burns. It is especially important from the standpoint of the function of this area that precautions be taken in planning to insure damp-proofing. The drying of uniforms should be achieved with every assurance that no injury will occur to the materials. A thermostatically controlled heating and blower system is highly desirable.

Additional Storage Rooms

There will be need for still further additional space for the storage of chairs, portable bleachers, table tennis tables, volleyball and badminton standards, jumping standards, tackling dummies, custodial supplies and equipment, and numerous other items. It is important that attention be given this matter in the original building plans, and that such storage space be provided adjacent to the areas to be served. A lack of storage space for equipment has been one of the most common errors in the planning of physical education buildings.

Laundry

Many institutions have found it advantageous to maintain and operate a laundry service. Where such facilities are not already provided on the campus, it may be desirable to plan for the location and equipping of a laundry room in connection with the physical education building.

The location of laundry facilities should be considered in terms of accessibility to the areas to be served. Ideally, the laundry should be located convenient to the equipment supply room. It is desirable that the location of this area be on the ground level in order to facilitate the moving and installation of necessary heavy machines and equipment, and to provide easy access to this area for delivery trucks. A roadway and service entrance should be provided.

The dimensions of the laundry room will be determined primarily by the amount and kind of equipment to be installed, and the volume of work required in the local situation. Specifications can be obtained from companies that manufacture laundry equipment.

Special consideration must be given the surfaces of the laundry area. Floors should be moisture-proof, constructed of a material that will withstand considerable wear and tear, present a non-skid footing and be impervious to detergents used in connection with the laundry service. Wall and ceiling surfaces likewise should be impervious to moisture.

Appropriate lighting, heating and ventilation provisions are important in this area. Mechanical ventilation will be required, and special attention should be given to the prevention of condensation of moisture. Overhead vapor-proof light fixtures should provide a level of illumination of approximately 50 foot-candles at the working level throughout the room.

The planning of the laundry room must include provision for adequate hot and cold water supply and drainage. Floors preferably should be pitched toward side drains to carry off surface water. The drain covers should be of the removable type which can be easily cleaned.

Dressing, toilet, and lavatory facilities should be planned to serve the laundry workers. These should be located convenient to the laundry area but should not be a part of it.

It is important that the doors leading to this room from the service entrance be of sufficient width to permit the passage of the equipment to be installed. Door thresholds should be omitted so as not to interfere with the moving of rolling equipment.

It should be noted that certain companies which manufacture laundry equipment are now installing and servicing automatic washers and dryers in educational institutions at a reasonable service fee. This fact may be of value to authorities in smaller institutions where it is felt that the price of commercial laundry equipment virtually prohibits its purchase.

A supply and storage room should be planned adjacent to the laundry room and used for the storing of supplies necessary in the operation of a laundry service. Shelves, drawers, and bins of appropriate and varying size should be built along the walls of this room and may extend to the ceiling.

Health Service Suite

Every institution of higher learning should provide health service facilities for all students, faculty members, and all other staff personnel employed by the college or university, readily accessible to all who will use them. Ideally, a separate building should be provided for health service activities, this to be fully staffed and equipped for its particular function, and located in a quiet section of the campus. In smaller institutions, however, the health service is usually provided in conjunction with a residence hall or the physical education building.

There will be no attempt here to specify details of the health service suite, as this is the function of a special committee including physicians, dentists, nurses and others who will use the facilities. The suggestions offered are merely for the purpose of pointing out general needs of college health service programs.

If the original physical education building plans call for inclusion of health service facilities, there are several pertinent factors which should be considered in the desirable location and layout of the health service suite. Careful consideration should be given the isolation of this unit as, otherwise, the normal activities of the physical education program may prove a disturbing influence. The reduction of outside noises is important. In addition to the isolation of facilities through location, it would be desirable to soundproof the walls near activity areas.

In the interests of isolation and optimum function, the ideal location of the health service suite is in a wing of the building and on the ground level. Entrances and exits should be so planned that those using the facilities may enter and leave directly from and to the outside, without the necessity of passing through corridors from the main entrance of the building. Persons using the facilities should not be required to climb flights of stairs. The location of the unit should be such that a driveway and entrance can be provided for the delivery of supplies and for ambulance service.

In view of the various functions served by the health service, it is imperative that several rooms be included in the suite, each planned in terms of its specific purpose, and arranged according to the normal routing of students. The number and size of these special areas will be determined by the number of students and college personnel to be served, the number of physicians and nurses employed, and the equipment to be installed.

The following areas are considered to be minimum requirements in a large institution.

Reception-waiting room. -- The initial entrance to the health service suite should lead into an attractive and spacious reception area. In the interests of economy and utility, this room might well serve the dual function of providing a comfortable waiting lounge for students and a work area for the clerical staff. The two areas might be separated by a low balustrade or large counter.

Space provision should include that necessary for large metal filing cabinets in which health records are kept, a large storage closet for supplies needed in clerical work, desks and chairs for office personnel, and comfortable furniture to accommodate those persons in the reception-waiting area.

The atmosphere of this room should be as pleasant and comfortable as possible, particular consideration being given natural and artificial lighting, heating, and ventilation, and the selection of furniture. It is suggested that walls and ceilings be of cheerful pastel colors, that drapes or venetian blinds be provided for the windows, and that an attractive and functional floor surface be provided.

Physicians' Offices. --Separate offices should be provided for physicians employed in the health service. These need not be large, but should be of sufficient size to accommodate a desk, chairs, filing cabinet, storage cabinet, and other equipment necessary in normal office routine. A minimum size of 100 square feet is suggested. Provisions for the storage of personal clothing should be made. Since many institutions employ physicians of both sexes, it will be of functional importance to locate specific offices adjacent to examining rooms for men or women students.

The offices should be linked to the reception room by means of intercommunication telephones.

Nurses' Station. --Office space should be provided for the nurses employed in the health service. This space may be in the form of one large office equipped with desks, chairs and other necessary working materials for nurses on duty. The most desirable location for this area is directly adjacent to examination rooms.

A small sleeping room should be provided off this main room for the convenience of nurses on night duty.

Dressing-Toilet Suites. -- It will be necessary to provide dressing, shower, toilet and lavatory facilities for physicians, nurses, secretaries and other persons employed in the health service. A separate suite should be provided for both sexes.

Kitchenette. -- A small kitchenette may be provided for the use of those employed in the health service and for the preparation of occasional snacks for students in isolation areas. This kitchenette should include electric or gas range, refrigerator, sink and counter, and storage area for supplies. A large metal disposal can should be provided for refuse.

Examination rooms. -- At least one large examination room for each sex, -or several small examining cubicles, - should be included in the health service suite. These should be located convenient to the offices of physicians and nurses, with entrances from the reception room. Several dressing cubicles should be provided off the examination rooms, in conjunction with toilets and lavatories for both sexes. The dressing cubicles may be arranged along one end or side of the area, and may be separated by partitions. Each cubicle should provide a bench or seat, clothes hooks and hangers, and a wall mirror.

The examination rooms should be equipped with examination tables, medical cabinets and instrument tables, chairs, adjustable height foot stools, sinks with hot and cold water, counter space on both sides of sink, soap and paper towel dispensers, upright scales with measuring rods, a full-length mirror, and one or more covered waste cans with foot pedals.

Provision should be made for visual testing in connection with each examination room.

Proper ventilation and lighting are very important in the examination rooms. Adequate artificial lighting should be provided through the use of indirect overhead fixtures, with a minimum of 50 foot-candles of light on working surfaces.

The walls and ceilings of these rooms should preferably be of a light cheerful color, and such equipment as tables, cabinets, and chairs should be finished with white procelain or a similar material which can be easily cleaned.

It is desirable that an outside exit, or one leading to the corridor, be provided off the examination rooms. This will facilitate the routing of students from the reception room to the examination room, and then to the outside, without the necessity of returning to the reception room. A filing cabinet should be provided for the temporary storage of health record cards brought to this area from the reception room. A report of the findings should be made on these cards at the time of the examination. These record cards should be returned to the central filing cabinets at the end of the day.

Conference room. -- Unless provision is made in the office of the physician in charge, there should be included in the health service suite a special room for conferences and meetings of the college or university health council, or other health service personnel. This area should contain a large conference table and chairs, and provision should be made for the storage of coats and hats.

Hearing testing room. -- A small sound-proof room (or rooms) should be provided near the examination rooms for the purpose of testing hearing. This area should be equipped with a sturdy table of sufficient size to accommodate one or more audiometers, several chairs, an adequate number of electric outlets for the machines to be used. A recessed storage cabinet and drawers should be included for the housing of audiometers and the storage of records used with these testing devices.

Technicians' laboratory. -- It will be necessary to include space provision for a laboratory to be utilized for the conducting and analyzing of tests in the health examination. The room should be located near the examination rooms, and should be equipped with laboratory tables, autoclave, steam sterilizer, centrifuge, microscope, Bunson burners, several electrical outlets for the various instruments and equipment in the area, sinks with hot and coldwater, a large refrigerator, water baths, a colorimeter, and wall cabinets and shelves. Particular attention should be given to the provision of electrical outlets with appropriate voltages to handle the requirements of specialized equipment.

X-ray room. -- A separate area must be provided for the use and storage of x-ray machines and equipment, the size to be determined by the equipment installed. Suggested specifications and space provisions may be obtained from companies manufacturing and installing x-ray equipment.

Dark room. -- A small dark room should be planned in conjunction with, and adjacent to, the x-ray area. This should be equipped with running water, developing tubs, and racks for hanging pictures to dry.

Consideration should be given to the provision of mechanical ventilation in this room, since window ventilation will not be possible.

Dental examination room. -- An area should be provided convenient to the examination rooms for the use of dentists and dental hygienists working in conjunction with health service physicians. This room should be of sufficient size to accommodate at least two adjustable dental chairs, instrument tables, storage cabinets, and sinks providing hot and cold water.

Careful attention should be given to the provision of adequate natural and artificial light in the dental examination room, as this factor is of great importance for work requiring visual efficiency. Windows should be directly in front of the dental chairs and, in addition, there should be provided an adjustable lamp of varying light intensities suspended from the ceiling or wall above each chair. A gas outlet will be required convenient to work tables and dental chairs.

Emergency isolation room. -- A special room should be provided for the temporary isolation of those persons found to have communicable diseases. This area should be equipped with cots, blankets, and pillows. For obvious reasons, it should be located convenient to the service entrance provided for ambulance service. Toilet and lavatory facilities should be located adjacent to the room. Separate areas must be provided for isolation of both sexes, either by permanent partitions or by installation of folding doors.

Custodial storage room. -- An area should be planned as part of the health service suite for the storage of custodial and maintenance supplies. This room should be convenient to all sections of the suite, and should include slop sink and adequate storage space and shelves for supplies.

Provisions for Spectators and the Press

Consideration should be given in the original building plans to the provision of facilities at athletic contests for spectators, players, sports writers, broadcasters, and photographers. The rapid increase of television coverage of college athletic events suggests that thought might also be given to the advisability of providing facilities and equipment for this rapidly growing field.

Where athletic contests or exhibitions are to be offered for the entertainment of students and the public, it will be necessary to provide some type of seating accommodations. The four common type of bleachers are: (1) those permanently constructed along the sides of the gymnasium; (2) those attached to and telescoped against the wall when not in use; (3) those which attach to and fold against the wall when not in use; and (4) those which are of a knock-down (portable) nature.

Permanent bleachers. -- Insofar as possible, spectator seating needs should be met by the installation of folding or telescopic bleachers which can be recessed in or folded up against the wall when not in use, thereby providing the maximum amount of activity space. It may be desirable, however, that permanent bleachers be installed at those institutions where considerable seating space is required for basketball games and where the gymnasium is to be used for such campus activities as graduation exercises, assemblies, or programs requiring maximum seating. Although such built-in bleacher areas occupy valuable space which otherwise might be utilized for physical education activities, this shortcoming can be circumvented, to some extent, by planning the underneath area for locker rooms, class rooms, equipment storerooms, offices, shower rooms, or activity areas.

The following factors should be considered in the planning of permanent seating facilities: (1) present and possible future spectator accommodation needs; (2) accessibility of the spectator areas to toilets, lavatories, drinking fountains, lobby, entrances, exits, and concessions; (3) state and local fire regulations and building codes; (4) the circulation of spectator traffic; and (5) visibility from all sections of the bleachers.

In too many instances, spectator provisions have been planned without consideration for possible future needs and student enrollment. Many gymnasiums, considered more than adequate when constructed only a decade ago, are now entirely inadequate from the standpoint of handling the crowds which desire to witness contests and exhibitions. This is perhaps the result of several factors: the increasing popularity of basketball in all sections of the country, an increase in leisure time, a higher economic standard, and the greatly increased enrollments in institutions of higher learning.

It is difficult to estimate accurately the seating capacity which should be provided, as many factors influence the needs of a particular institution. It is recommended, however, that in all but the very largest universities the minimum standard be the provision of a seat for every full-time student, with the possibility of future expansion.

In a gymnasium having floor dimensions of 126 x 106 feet, - as previously recommended for provision of 2 cross court basketball courts, 2 volleyball courts, and 6 badminton courts, - it is possible to provide approximately 1500 bleacher seats through installation of folding or telescopic bleachers on the sides of the floor. Through the use of spectator galleries, where seats rise from a height of approximately 10 feet above the playing floor, another 1500 persons can be accommodated. To increase seating capacity above 3000 it will be necessary to include a spectators' gallery at the ends as well as sides of the floor and/or raise the height of the ceiling above the recommended 25 foot standard.

Spectator galleries can be of the type providing permanent seats or they can be open floor areas with folding or telescopic bleachers which close into or against the wall. Long Beach City College in California is an outstanding example of a gymnasium planned to provide maximum seating and, at the same time, maximum floor space for activities through the construction of spectator galleries which provide gymnastics facilities on one side and a multiple purpose area on the other. The floors of these areas are of hard wood similar to the main playing floor.

Where permanent seating is planned, it is recommended that the bleacher area be of concrete, which provides strength and wearing qualities, and the surface pitched to permit water drainage when cleaned. Although chair-type seats provide greater comfort, they are not recommended in view of the comparatively high cost of installation, increased maintenance costs, and the fact that sweeping and scrubbing of under-seat areas becomes a difficult task. Seat boards should be securely fastened to the foundation by means of imbedded steel supports. The edges of seat boards should be rounded and the corners eased to prevent splintering and the tearing of clothing. Seats should be spaced not less than 22 inches back to back. The height of the seat above footboard or foundation should be not less than 17 inches and the rise per row should be not less than 8 inches. It is important that the top row of seats be set out from the wall approximately 5 inches, otherwise, these seats will be decidedly uncomfortable. It is equally important that the top seats not be adjacent to radiators, blowers, or wall obstructions.

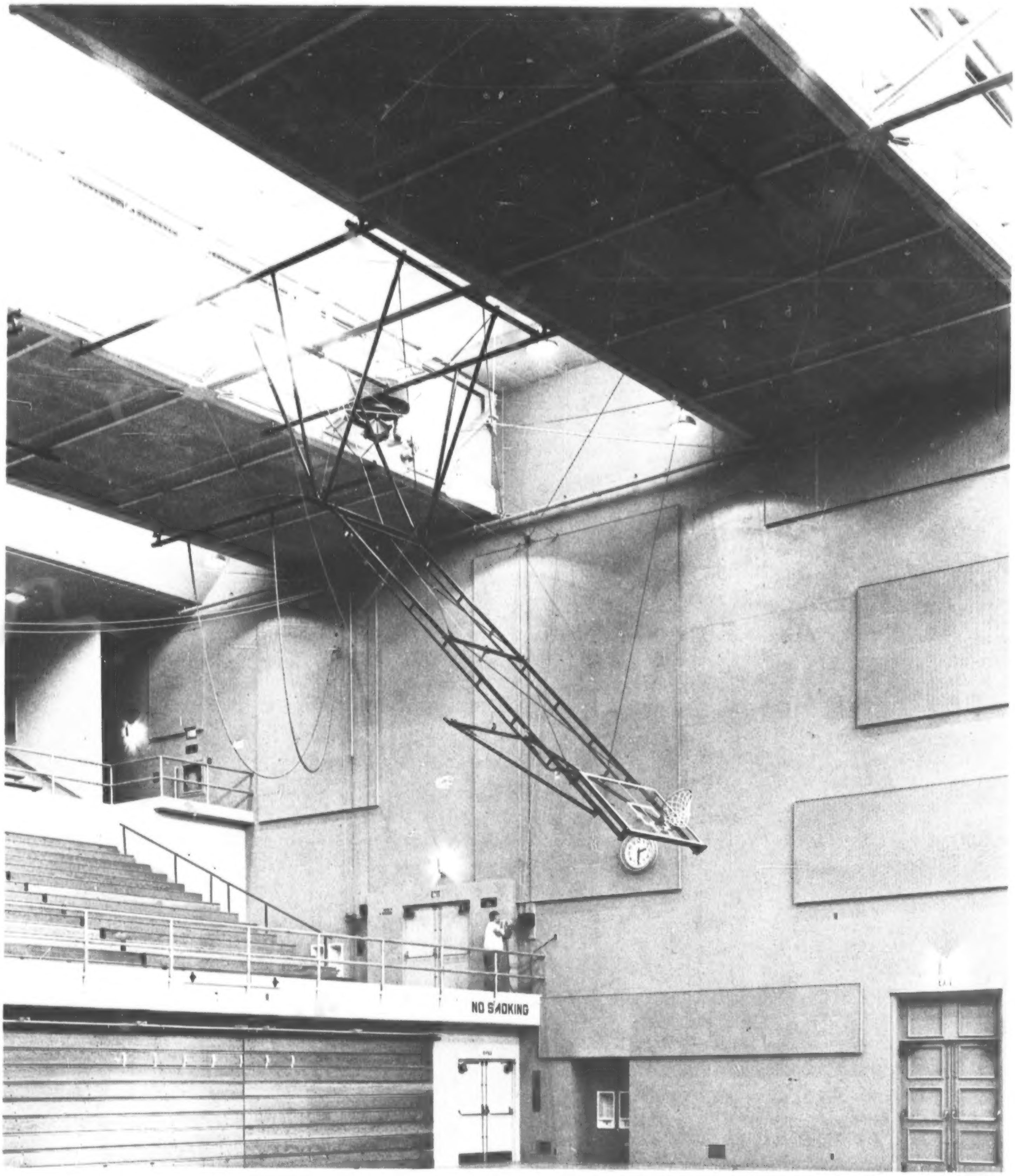

PLATE 17. Main Gymnasium, Long Beach City College, Long Beach, California. Courtesy of Long Beach Unified School District. Building custodian is shown raising one of side backboards by means of a portable electric motor designed specially for this purpose. Lower bleachers are in "nested" position while upper bleachers are ready for use. Note recessed drinking fountains and self-flushing cuspidors on both main floor and balcony. Also note acoustic tile panels on end wall.

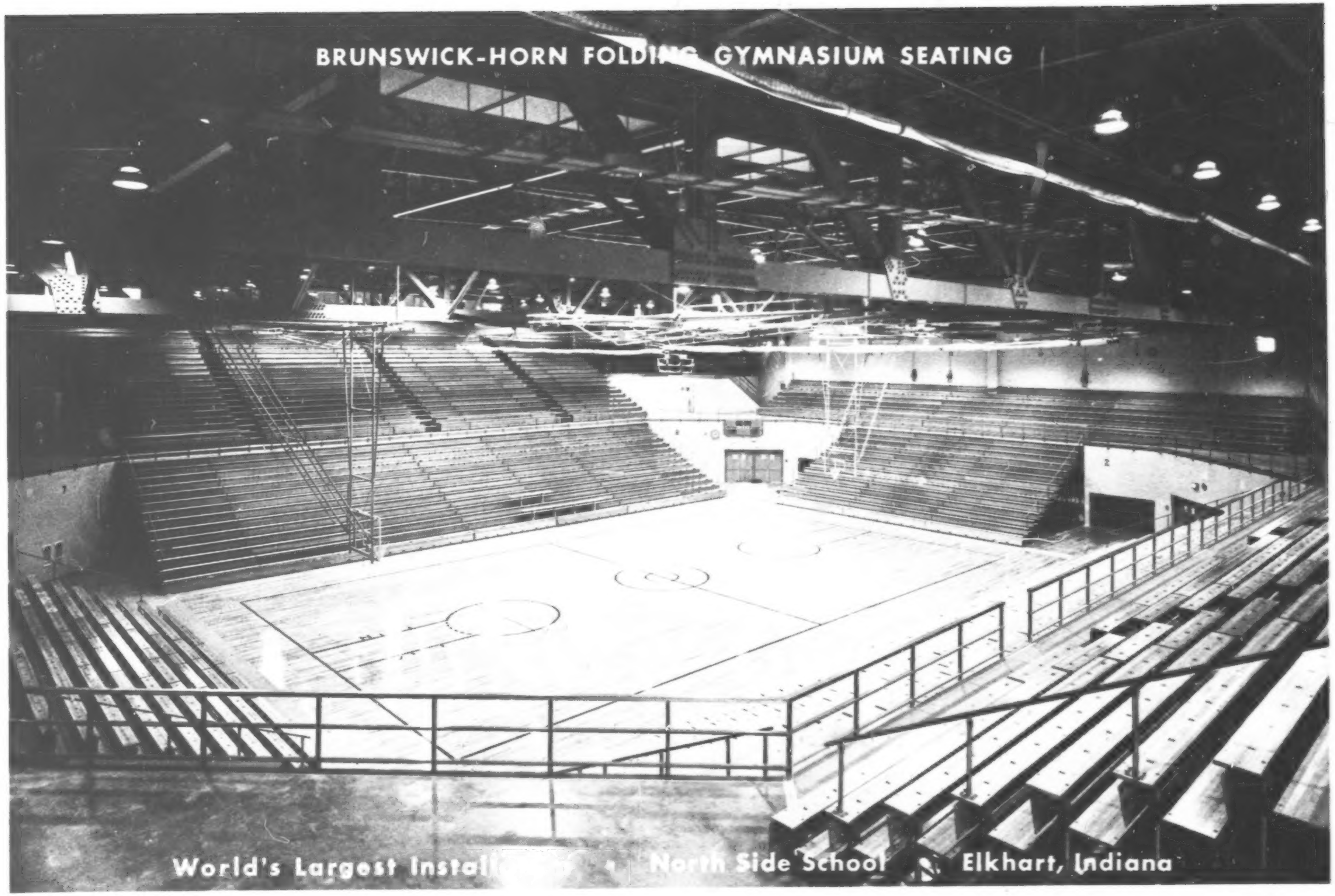
BRUNSWICK-HORN FOLDI GYMNASIUM SEATING
World's Largest Install
North Side School
Elkhart, Indiana

PLATE 18. Main Gymnasium, North Side School, Elkhart, Indiana. Courtesy of Brunswick Corporation. This is reported to be largest installation of telescopic bleachers in the world. When balcony bleachers are in closed position, floor area is available for many other physical education activities. Roll-up curtains can be dropped across middle of floor and at sides to isolate several teaching stations. Note catwalks along trusses; light fixtures can be lowered by cables.

Where permanent spectator galleries are provided, they preferably should be planned for use in conjunction with folding or telescopic bleachers. Such galleries should be hung at least 10 feet above the main floor. It is imperative that good sight lines to all parts of the playing floor are provided from every seat, and that railings are provided at the lower level to protect spectators from falling. No supporting columns for permanent bleachers should be placed on the gymnasium floor. Entrances to galleries should be from stairways which are convenient to the main building entrance and ticket windows.

Folding bleachers. -- Bleachers of the type which fold against the wall when not in use are preferable to the permanent type. In addition to allowing maximum floor space for physical education activities, if provided with a heavy smooth front, they may, when in the closed position, serve as a rebounding surface for one-wall handball play, backboard tennis practice, and other activities of the program. Folding bleachers have a distinct advantage over those of the knockdown type in that they can be quickly and easily folded against the wall after use. They possess the further advantages of eliminating the safety hazard of projecting bleacher ends and enhancing the attractiveness of the area.

A flat, unobstructed wall surface is of definite value in the physical education program, since many activities are possible only where such a surface is provided. If folding bleachers are to be included in the physical education building, it is important that plans for their installation be made prior to the construction of the walls. These bleachers, when folded, should be recessed and flush with the surrounding walls if it is technically possible to do so. The windows should, of course, be located above the top of the bleachers.

Telescopic bleachers. --Telescopic (rollaway) bleachers operate on much the same principle as the folding type, being attached to the wall and easily opened or closed. Unlike those of the folding type, they do not present a smooth rebounding surface when in the "nested" position. Where telescopic bleachers are provided, care must be taken that units are fitted with heavy duty, rubber-covered rollers to prevent marring of the floor. Certain makes of bleachers require the use of floor sockets to maintain the unit in a locked position. This fact should be considered in the floor plan. Units possessing an automatic locking device may be more desirable. One distinct advantage of the telescopic bleacher is that it can be so arranged that any number or all of the seat rows may be extended for use as required. Bleachers may be installed to fit the space requirements of any gymnasium, it being possible to purchase units of from 3 to 20 or more rows.

It is suggested that, where folding or telescopic bleachers are to be used, engineering data be prepared by representatives of reputable firms manufacturing this type unit. Layouts, specifications, and cost estimates are rendered without obligation.

Portable bleachers. -- Temporary knock-down bleachers are useful in providing spectator seating at contests or exhibitions where an over-capacity crowd is expected. They are not recommended as a substitute for permanent or folding bleachers, however. The physical education program will be hampered where portable bleachers are erected for all spectator activities, and their use requires the services of a considerable number of workmen. All activities of the program in the area must cease while the bleachers are being erected or taken down, and the available play space will be drastically reduced during those days when bleachers are erected. Portable bleachers have a further disadvantage in that the frequent erection and removal of the heavy pieces make it virtually impossible to prevent the marring and scratching of floor surfaces.

Where frequently used, it will be necessary to provide storage space for bleachers convenient to the areas to be served.

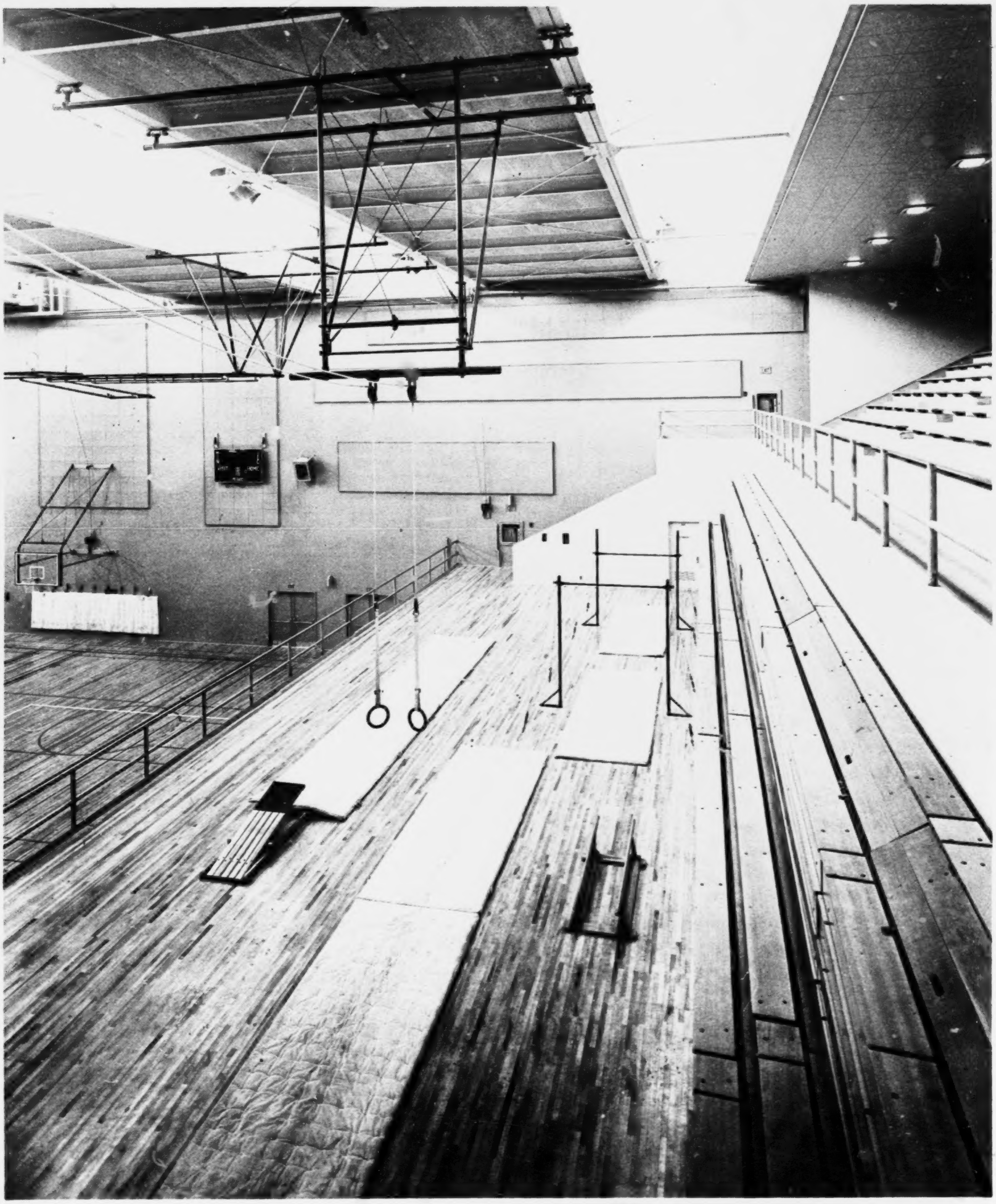

PLATE 19. Main Gymnasium, Long Beach City College, Long Beach, California. Courtesy of Long Beach Unified School District. Photograph shows use of balcony as a gymnastics area when bleachers are in "nested" position. Bleachers are shown here with bottom two rows pulled out for use by physical education classes.

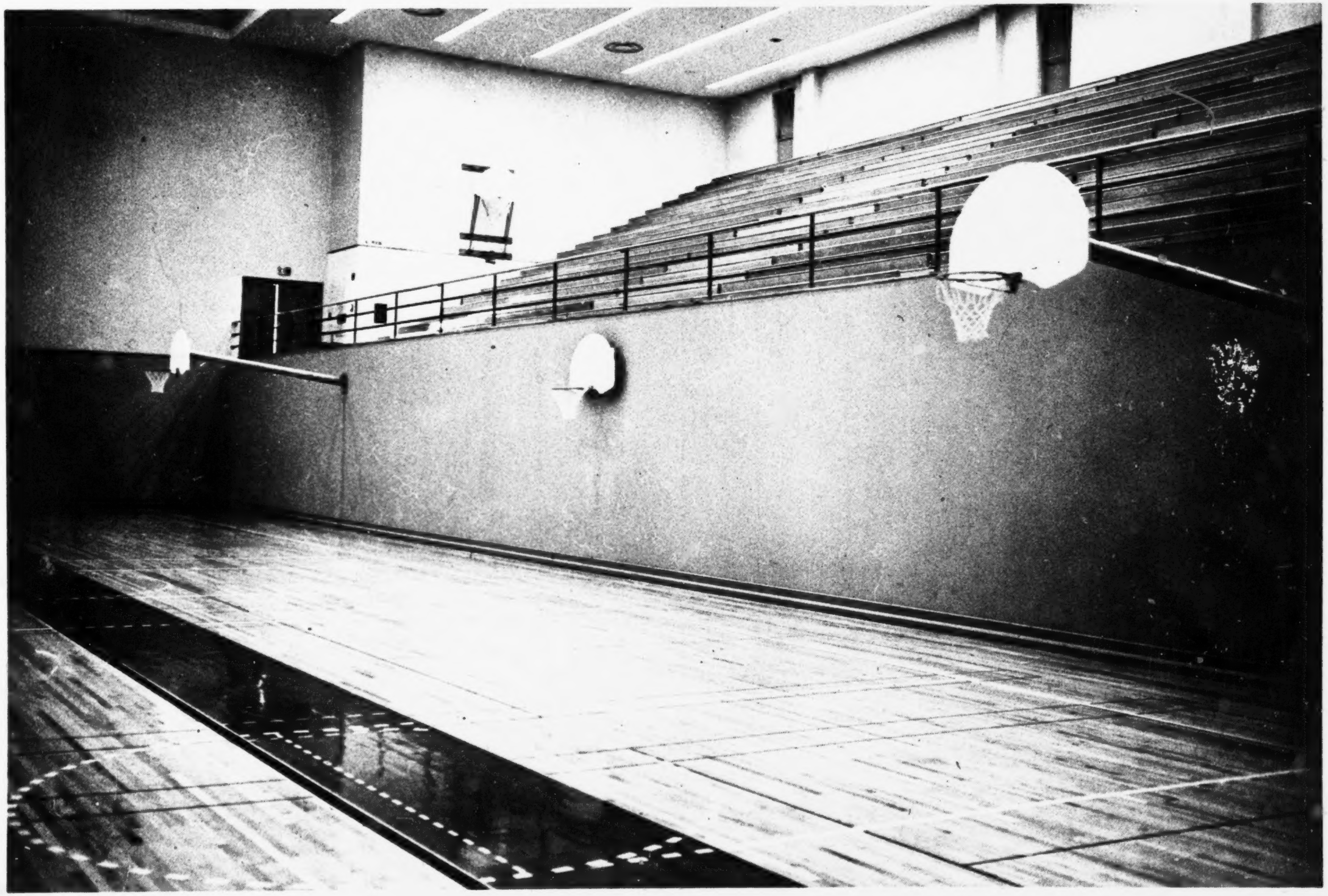

PLATE 20. Bleacher Area and Basketball Backboards, Bakersfield College Gymnasium, Bakersfield, California. Courtesy of Bakersfield College. Bleachers are of telescopic rollaway type which are easily opened or closed by two men. When bleachers are closed, balconies become auxiliary gymnasiums accommodating a regulation basketball court, badminton and volleyball courts. A unique feature is the "pistol" type basketball backboards, shown here in open and closed positions.

Facilities for Press and Radio Personnel

Increasing public interest in college athletics during the past few decades makes it advisable that special space provisions and facilities be planned for sports writers, radio personnel, and cameramen.

Sports writers may be located either at tables along the playing floor or in specially designed sections of the bleachers. It is important that they are not forced to sit as a part of the general crowd. If a section of the bleachers is set aside for the use of sports writers, it is important that this area be: (1) located where a clear view of the entire playing floor is possible, (2) located where spectators will not interfere with the view or functions of writers, and (3) specially designed to facilitate the work of those who will use this area. A continuous desk counter approximately 18 inches wide and 27 inches from the floor, with an allowance of about 2 linear feet per person for reporters, will provide adequate space for typewriters, score books, and other equipment of reporters. Seat back chairs are desirable in this section.

Figure 9 illustrates provisions for sports writers in George Huff Gymnasium at the University of Illinois:

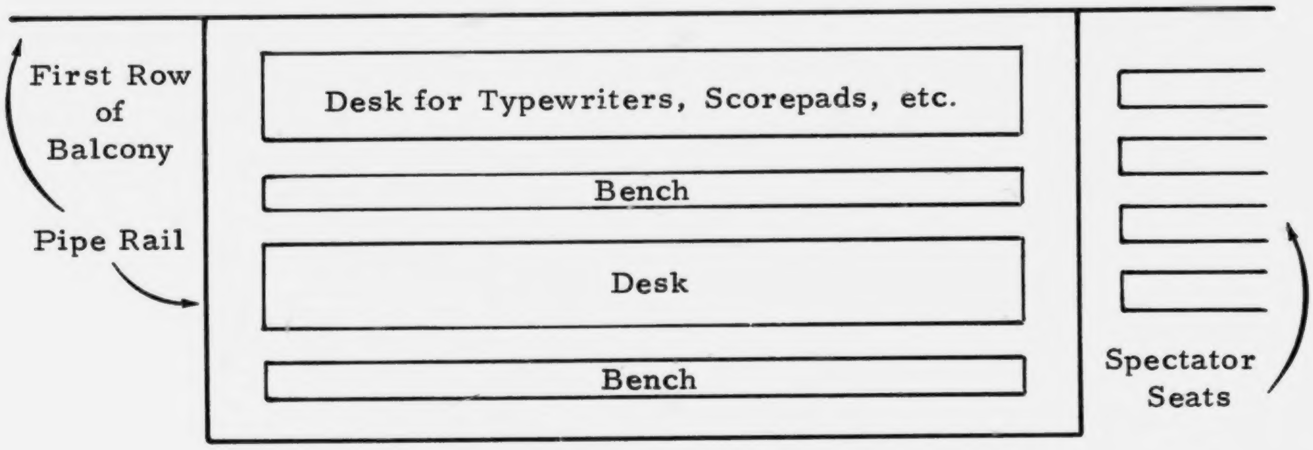

FIGURE 9. Facilities for Sports Writers, George Huff Gymnasium

Where provisions are included for radio broadcasting, a public address system, and television broadcasting, a separate sound-proof booth may be provided. The size of the booth will depend upon the space requirements for equipment and the number of persons who will ordinarily use the facilities.

The most desirable location for the broadcasting booth is on one side of the gymnasium, above and to the rear of spectators, and directly centered on the mid-line of the basketball playing court. The elevation should be such that a standing crowd will not obstruct the view of broadcasters and technicians. The location should provide a clear view of the entire playing floor and the scoreboard.

Ideally, the booth should be sound-proofed to isolate those persons within from the noise of the crowd. It is important that wiring for all equipment to be used in the area, artificial lighting, and mechanical ventilation, be provided. A desk of similar dimensions to that suggested for sports writers should be provided in the booth. The entire front of the enclosure, above desk level, should be covered by plate glass windows with a minimum of dividing obstructions. It should be possible to open these windows if desired.

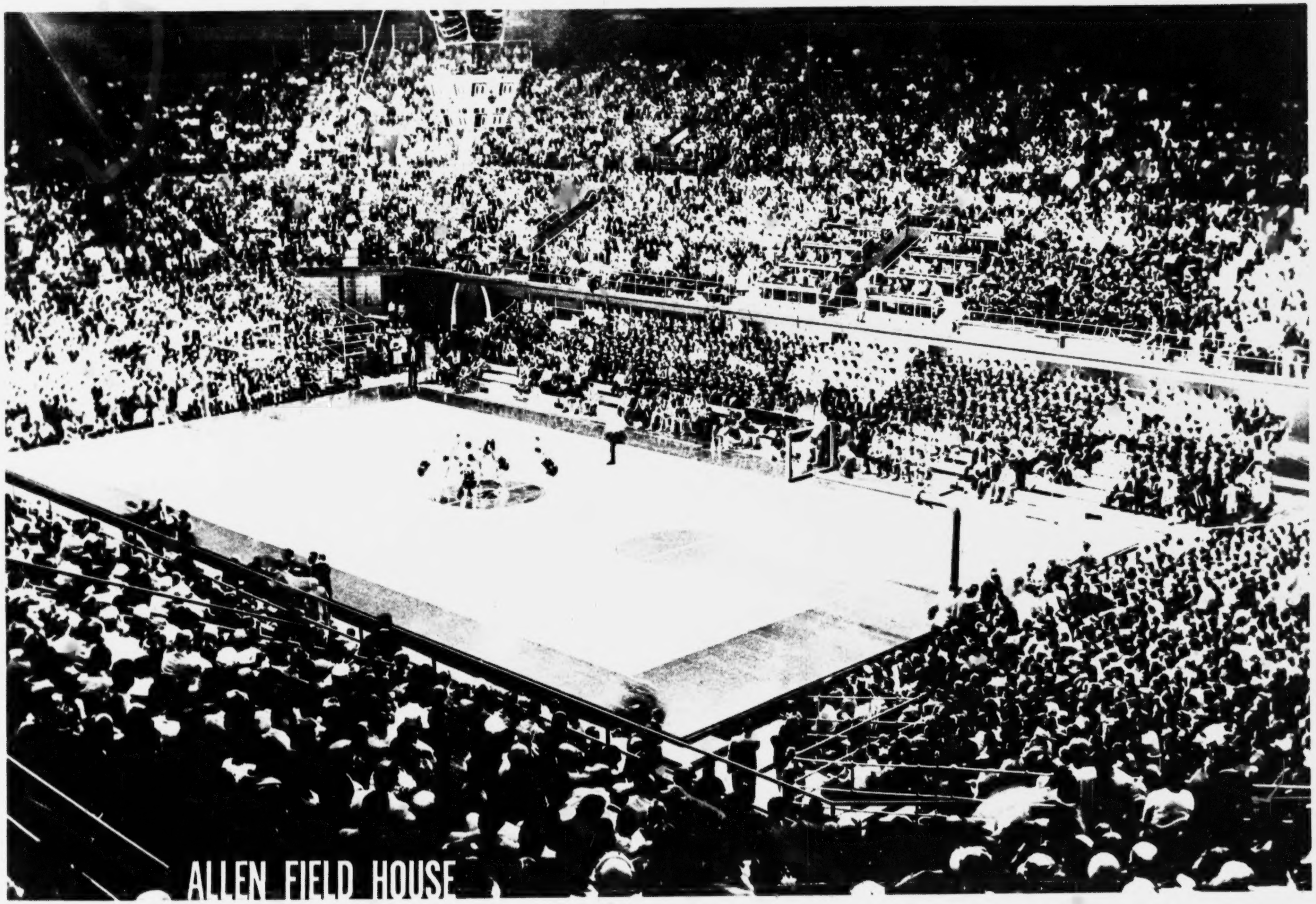

PLATE 21. Allen Field House, University of Kansas, Lawrence, Kansas. Courtesy of the Hillyard Chemical Company. Telescopic bleachers are used in conjunction with permanent seating. Note facilities for press, radio and television personnel in the lower center of the balcony where they are closer to the action on the floor than if they were at the top of the balcony. Also note large four-sided electrical scoreboard and public address speakers directly above the court.

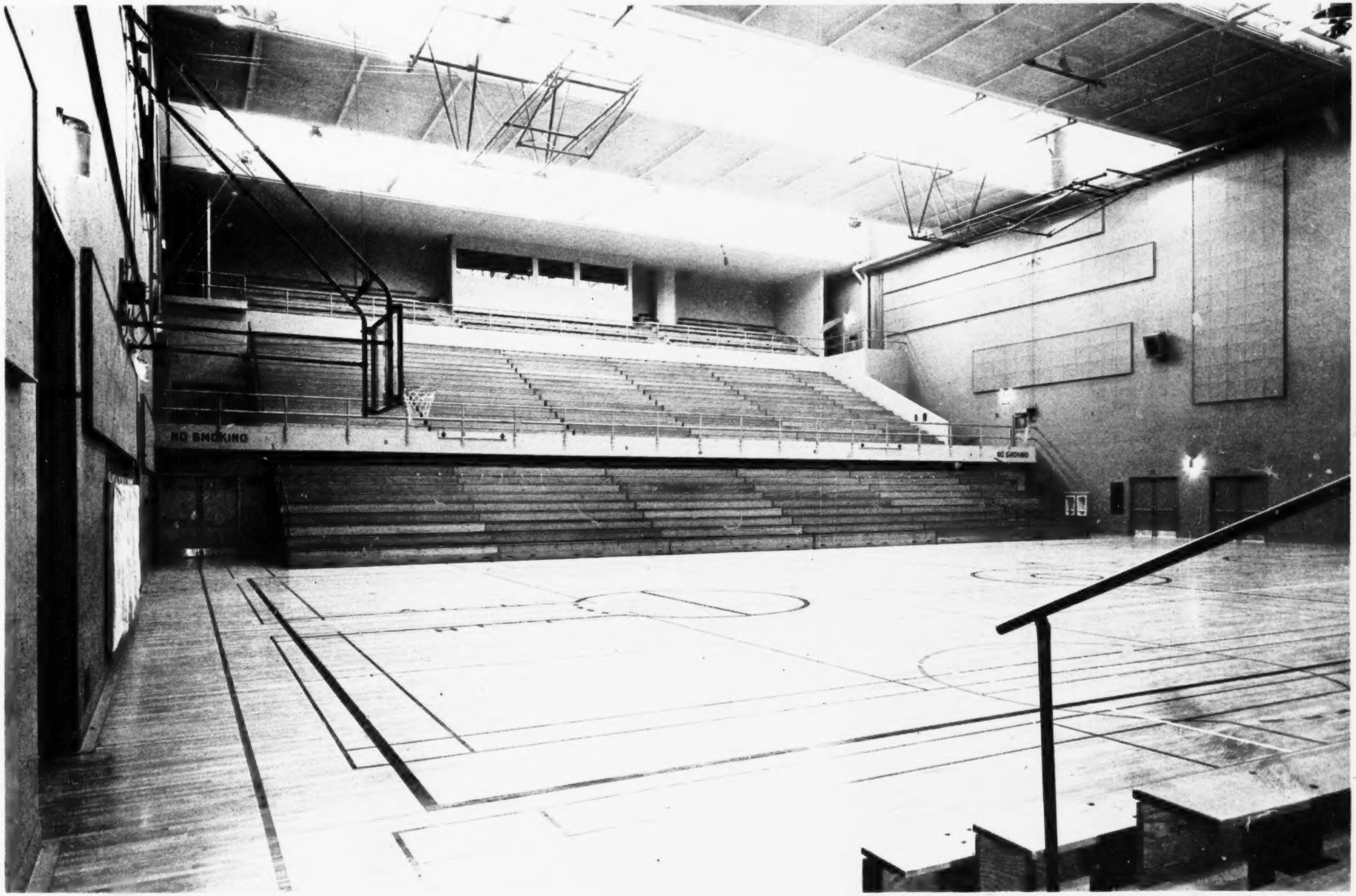

PLATE 22. Bleachers and Press Box, Main Gymnasium, Long Beach City College, Long Beach, California. Courtesy of Long Beach Unified School District. Bleachers are in three tiers; the lower tier recessing under the balcony; the second tier telescoping against the wall, thereby providing an auxiliary activities area; and the third tier at top providing a small permanent seating area. The seating capacity of this gymnasium is close to 4,000.

CHAPTER VI

FACILITIES COMMON TO ALL INDOOR AREAS

Architests, engineers, program specialists, and others of the building committee must plan each area of the physical education building in terms of its individual function in the total program. Each area, according to its purpose, will vary in such features as location, size, shape, and construction. Certain factors, however, are considered as being important to the planning and construction of the entire building and of each facility unit therein. These are referred to herein as general facilities common to all areas.

Complete information regarding specifications, prices and a list of the companies which manufacture all types of surfaces, lighting, heating, ventilating and air conditioning equipment, bleachers, furniture, hardware, lockers, storage cabinets and shelves, basketball backboards, gymnastics apparatus, and all other materials and equipment desired in the planning and construction of the physical education building, can be obtained through the following or similar sources: Annual volumes of (1) American School and University, (2) Sweet's Catalog Index, and (3) Western States A-E-C Catalog File.[1] School authorities will find these sources of great value in determining choices of materials and equipment, and in finding companies that manufacture the equipment. Architects will usually have the latest volumes of these or similar publications.

Surfaces

Years of research and experimentation have proven certain surface materials to be more satisfactory than others in withstanding the wear and tear to which they are subjected. It should be pointed out that although specific materials are recommended here as being particularly desirable, their cost and unavailability in some sections of the country may restrict or prohibit their use in many institutions. It is also realized that new materials on the market, other than those suggested, may be as good or better under some circumstances. Manufacturers are constantly striving to develop materials of greater strength, durability, and attractiveness than those now in use.

Floors

There are three general types of floor materials to consider in the physical education building: (1) those for locker, shower, toilet, drying rooms; (2) those for the main gymnasium and other activity areas; and (3) those for the lobby, corridors, class rooms, and offices.

A hard, impervious floor is more desirable for surfacing of the locker-shower-toilet-drying unit since it is much less affected by moisture and can be more readily cleaned than wood, cork, or other resilient floor coverings. Slip-resistive ceramic tile is suggested as being the most satisfactory, as well as the most attractive surface, although its cost may restrict utilization where economy of funds is an important consideration. Abrasive concrete is more economical and, consequently, more widely used. No matter what type of surfacing is planned for these areas, it is important that the floors be non-absorbent and also provide secure footing when wet. The number of serious accidents due to students falling on locker or shower room floors is sufficient reason for considering the criterion of safety and not merely the cost of materials. Where slippery floors are already in use, the condition may be partially corrected by painting with a specially prepared abrasive paint product.

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[1] This Catalog File is prepared exclusively for architects, engineers and contractors in the western states.

Floors in the locker-shower-toilet-drying room suite preferably should be a light color, not only from the standpoint of attractiveness but also from the standpoint of function. Dark colors obscure dirt, reflect light poorly, show water and soap stains, and require more custodial care.

Experience has indicated that first grade hard maple flooring is the best all-round surface material for activity areas and possibly offices and classrooms. Birch, beech, hard yellow pine, fir or oak will serve satisfactorily in sections of the country where one of these is more readily available and, consequently, much less expensive than hard maple. Asphalt tile, rubber tile, linoleum, or vinyl tile will also serve as satisfactory flooring in classrooms, offices, recreation room, and health service, and are available at a lower cost than hardwood flooring. Terrazzo and ceramic tile are highly satisfactory in lobbies and corridors.

Nature allows "Northern Hard Maple" trees a very slow growth. The wood is diffuse-porous, meaning there is no marked contrast of the vessels or pores in the springwood and in the summerwood. This makes the pores appear evenly scattered and accounts for the fine texture and close grain of the wood. The slow growth of hard maple packs the wood tightly, making it hard and strong. It is easy to finish, economical to maintain, and has a long life.

Hardwood floors, because of their resilience and warmth, are less fatiguing than the rigid type of floor coverings. This is borne out by tests which show that wood in general has a peculiar type of resilience which absorbs shock. Tests have also shown that floors of Northern Hard Maple are "fast" under traffic and definitely absorb shock caused by walking. This means real comfort underfoot because the human body is spared tiring strain.

Williams and Brownell[1] suggest the following standards for all wood floors: (1) boards should be straight-grained and free from knots; (2) boards should be one and one-quarter inches in width and three-quarters of an inch thickness; (3) boards should be tongued and grooved and fastened to a sub-floor laid diagonally; (4) the sub-floor should be attached to felt-lined screeds or strips anchored to a concrete base--to increase resiliency and prevent sound reverberations. Long, narrow strips are recommended because of less shrinkage and smaller cracks. Short lengths are not satisfactory, as there are too many cross cracks and too many chances for bits of the ends to chip off. The flooring should be seasoned and dry when it is laid.

One of the most satisfactory methods for the original treatment of hardwood floors is as follows:[2] (1) sand carefully to a smooth surface and clean thoroughly without water; (2) apply a penetrating floor seal; (3) allow this to dry well, then buff; (4) repeat this process.

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[1] J. F. Williams and C. L. Brownell, op. cit., p. 257.

[2] The College Physical Education Association, op. cit., p. 78.

To obtain almost permanent floor markings, stain may be mixed with the paint and the lines put on before the first coat of penetrating seal.

A product called Lignafold has proven quite satisfactory from the standpoint of providing a tough and durable surface for wood floors.[1] After the top floor has been sanded smooth, filled and stained, it is coated with a liberal application of this material which is allowed to soak into the boards for a period of several days. The surface does not have a high gloss, as compared with that provided by the more commonly used floor finishes, but does acquire a mild gloss with continued use. It provides a fine playing floor for basketball, badminton, volleyball and other activities requiring a nonslip floor surface. An additional advantage is the lack of glare from light reflection on the floor.

Walls

The outside walls of the gymnasium are generally of brick, concrete or stone, and should conform to the architectural style and construction of other buildings on the campus. The program specialist and other members of the building committee, therefore, are more concerned with the problem of providing the most durable, attractive, economical, and functional inner wall surface for each unit of the building.

There are many requirements and service purposes, some general and others specific, that need to be met by satisfactory walls. Generally all walls should serve as at least partial barriers to the passage of sound, moisture, light, air, heat, and foreign materials. They should meet the criterion of economy, yet should present an attractive appearance. No wall should constitute a hazard to occupants because of its rough or uneven surface. In addition to these general purposes, some need to serve specifically as rebounding surfaces for balls, others as places to attach apparatus and equipment, others as acoustical material, others as reflectors of light, and still others as particularly efficient barriers to the passage of moisture or sound.[2]

The following items are important considerations in wall construction from the standpoint of function:

1. A smooth inner wall surface, especially where activity groups may come in contact with it, will prevent abrasions.

2. A rough wall collects dirt and is difficult to clean.

3. It may be desirable that lower and upper walls be of different materials.

4. Light colored walls reflect light better, provide a more cheerful atmosphere, and require less custodial care.

5. All walls in activity areas should be given appropriate acoustical consideration and possibly, treatment.

6. If the wall is to be used for a rebounding surface, it should be free from windows, radiators, and pipes to a height of about 12 feet. It should be of a

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[1] J. E. Hewitt, "Building College Gymnasiums," The Journal of Health, Physical Education and Recreation, January, 1956, p. 47.

[2] E. F. Voltmer and A. A. Esslinger. op. cit., p. 190.

material that will not crack and that offers a smooth, durable finish.

7. Fastenings for equipment and apparatus should be placed in the wall before the finish surface is put on.

8. All wall surfaces in the locker-shower-toilet suite should be water resistant and easily cleaned.

In those regions of the nation infested with termites, special precautions are required to protect wood in all parts of the building. Information on this subject, as well as general information on the entire problem of termite control, may be found in the publication, "Termites and Termite Control", prepared by an editorial board and submitted as a report to the Termite Investigation Committee. This book is published by the University of California Press at Berkeley.

Ceilings

The type of ceiling materials to be used in the physical education building will vary according to the function of the particular area. Acoustic tile, glazed tile, structural tile, concrete, and plaster have been widely used in the past. Acoustic tile is considered to be the most satisfactory ceiling surface material for all activity rooms, the locker-dressing suite, classrooms, and offices. The use of ordinary plaster is decreasing due to its tendency to crumble and crack, absorb moisture, reverberate sounds, and failure to withstand strain. It is very important that ceilings of the laundry room, natatorium, shower and drying rooms be moisture resistant.

A suspended ceiling of light colored acoustic tile in the main gymnasium will be far more attractive, provide superior acoustics, and be a much better reflector of natural and artificial light than the traditional open-truss type ceiling.

Recommended wall, ceiling and floor surface materials are shown in Table 3 . It should be noted that certain new materials being put on the market at the present time are proving satisfactory in terms of function, attractiveness and economy. For example, two new wall surfaces have been used in the recently constructed Physical Education Building at the University of California, Riverside.[1] An attractive green vinyl plastic wall covering called Kalistron is provided on lower wall surfaces of the main gymnasium. Kalistron comes in pliable sheets which are merely cemented to the surface of walls and doors. It is easily cleaned, attractive, difficult to scratch or mar, requires little upkeep and is economical from the long term point of view. By using this material it is possible to provide initial wall and door surfaces of a more economical type and, through the addition of a Kalistron covering, realize all the advantages of far more expensive materials. Walls above the vinyl plastic are of large Insulrock panels 32 inches x 96 inches x 1 inch thick. This is a pressed wood product which provides good insulation, acoustics, and is attractive in appearance.

Lighting

No phase of school building planning presents more confusion, is a subject of greater controversy, or is more challenging than the question of lighting. Until quite recently, our thinking has been devoted largely to the "quantity" of light; i. e., the number of foot-candles present in any prescribed area. Throughout the years there has been a steady increase in the quantity recommended, this increase being from 0. 4 of a foot-candle in 1896

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[1] J. E. Hewitt, op. cit., p. 47.

TABLE 3
SUGGESTED INDOOR SURFACE MATERIALS[1]

Rooms	Floors					Lower Walls								Upper Walls						Ceilings			
	Asphalt, Rubber, or Linoleum tile	Concrete, Abrasive & non-absorbent	Maple hard	Terrazzo, abrasive	Tile, Ceramic	Brick	Brick, glazed	Cinder block	Concrete	Plaster	Tile Ceramic	Wood panel	Moisture proof	Brick	Brick, glazed	Cinder block	Plaster	Acoustic	Moisture resistant	Concrete, or structure tile	Plaster	Tile, acoustic.	Moisture resistant
Apparatus Storage		1	2			1		2	1	C													
Classrooms	2		1					2		1		2				2	1			C	C	1	
Club Room	2		1					2		1		2				2	1			C	C	1	
Corrective Room			1			2	1					2		2	2	1	2					1	
Custodial Room		1			2																		
Custodial Supplies		1			2																		
Dance Studio	2		1																	C	C	1	
Drying Room (Equip.)		1		2	2	1	2	1	1					1		1							
Equipment Drying		1																					
Gymnasium			1			2	1					2		2	2	1	2	x		C	C	1	
Health Service	1		1					2		1		2				2	1					1	
Laundry Room		2			1	2	1	2	2		1	C	x						x				x
Locker Rooms		3		2	1		1	2	2	3	1		x	1		1	2				C	1	
Natatorium					1	2	1	3	2		1		x	2	2	1		x	x	C	C	1	x
Office Suite	2		1					2		1		1				2	1					1	
Recreation Room	2		1			2		2		1		1		2		1	2	x			C	1	
Shower Rooms		3		2	1		1			2	1		x	2	1	2	2		x			1	x
Special Activity	2		1				2			1		1		1		1	1				C	1	
Team Room		3		2	1	2	1	2	2	3	1		x	1		1	2				C	1	
Toilet Rooms		3		2	1		1	2	2	2	1		x	1		1	1					1	
Towel Room		3		2	1		1	2	2	2	1		x	1		1	1					1	
Toweling Drying Room (bath)		3		2	1		1			2	1		x	2	1	2	2		x			1	x

The numbers in the chart indicate first, second and third choices. "C" indicates the material as being contrary to good practice. An "x" indicates desirable quality.

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[1] The College Physical Education Association, *op. cit.* p. 79.

to 15 foot candles in 1938.[1] The 1938 edition of American Recommended Practice of School Lighting published by the Illuminating Engineering Society recommended a level of 15 foot-candles of illumination for ordinary classroom and study hall tasks. The 1948 edition of this study raised the standard to a minimum of 30 foot-candles for these areas, and a 1962 revision suggested still higher levels with emphasis on quality rather than on quantity.

The majority of experts now vigorously challenge the narrow foot-candle concept of good lighting. The claim is made, with ample evidence, that the quality of light; i. e., distribution, reflection-factor, and brightness-ratios, is equal in importance to the quantity of light falling on a visual task. For purposes of clarification, the factors involved in the quantity and quality of adequate lighting will be briefly defined and explained.[2]

Quantity factors: Foot-candles. -- The amount of light produced on a surface one foot square at the distance of one foot from a standard candle. This is the unit of intensity or quantity of light falling on any given surface. This is measured by an instrument called the foot-candle meter.

Foot-lamberts. --The most common unit of brightness. It is used to measure the average brightness of a light source or the average brightness of any reflecting surface. If 100 foot-candles fall upon a white piece of paper with a reflection factor of 80 per cent, the paper absorbs 20 per cent of the light and reflects back to the eye 80 foot-lamberts. At the present time there is no thoroughly accurate and objective instrument for measuring this reflected light. The brightness meter is a step in the right direction, but does not eliminate subjective judgment.

Quality factors: Distribution. -- The general spread of light over any given area. The distribution of light is one of the more measurable tests of the quality of a lighting installation. Proper distribution will result in two observable conditions: first, there will be uniform lighting over the whole working area; and second, the illumination will be free from shadows.

Glare. -- Any brightness within the field of vision of such character as to cause annoyance, discomfort, eye fatigue, or interference with vision. This lighting factor invariably is considered in two forms -- directed and reflected. No direct glare should be tolerated from any light source, and the reflected glare from the work or surroundings should be held to a minimum.

Brightness-ratios. --The ratio of the brightness of the seeing task to the brightness of the general surroundings; i. e., the brightness ratio between the white background of printed material and the desk top, chalkboard, walls, equipment, or floor. Ideally, the brightness of the tak and the brightness of the surroundings should be the same, but a ratio of 50 to 1 would represent a great improvement over most existing conditions.

Reflection-factor. --The percentage of light reflected by any given surface. To maintain a brightness balance with sufficient intensity for adequate vision, all surfaces within a room should be relatively light, with flat rather than glossy finish.

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[1] D. L. Essex, "Lighting for School Buildings," American School and University, 20th ed., New York, American School Publishing Corporation, 1948-49, p. 124.

[2] Charles Bursch and C. D. Gibson, "Daylighting the School Plant, "American School and University, 17th ed., New York, American School Publishing Corporation, 1945-46, p. 72

Since this is a highly technical field, discussion here will be limited to an analysis of the lighting problem as it pertains to the physical education building. It is recommended that illumination experts and architects be permitted substantial freedom in the planning and installation of lighting equipment. The program specialist should simply interpret to these experts the lighting needs of specific areas and activities within the buildings.

Fenestration

Despite the tremendous gains made in recent years in the field of artificial lighting, natural lighting is still considered the primary source of illumination during the major part of the day in most activity areas, offices, and classrooms. One of the greatest peculiarities of the modern structure over those of past decades is the greatly increased number, type and size of windows provided.

Windows may serve the double function of providing for ventilation and admitting natural light. In view of this, the window area should be sufficiently large and properly arranged to care for these two functions under normal daytime conditions. Where possible, windows should be provided on both sides of the main gymnasium. Critics of the bilateral principle of lighting claim that light glare is always present at certain times of the day, but the use of louvers, glass blocks and other techniques of light control has made bilateral lighting superior to that of the unilateral principle.

The louver or projected type window serves well the functions of permitting natural light, allowing ventilation of the area, and at the same time excluding rain and snow. The single pivot section, fastened in the center and swinging out at the bottom and in at the top, tends to break air currents and acts as a shelter against rain while admitting air at top and bottom. Manually operated devices for opening and closing of windows are preferable to a centrally located electrical device. A hand crank located on the wall permits operation of windows by those using the area.

Protective heavy wire mesh screens should be placed over all windows to prevent breakage. These should be so fastened to the window frame as to permit operation of windows without the necessity of removing screens. It is recommended that window panes be of the sectional type, as the replacement cost is decidedly less for small panes than for large ones.

Windows at the ends of the gymnasium are not recommended as it is difficult to diffuse the light sufficiently to prevent glare without at the same time reducing the practical value of the window area. Directional glass blocks have some advantages worth considering, but to realize sufficient natural light it might be necessary to provide virtually an entire end wall of glass block, at substantial cost and of questionable value.

The height of windows is an important consideration in permitting adequate light and preventing glare in the eyes of participants. The light from the top of the window is most effective in lighting the room. For that reason, windows should be extended as close to the ceiling as possible. Since players face all directions while participating in activities in the gymnasium, it is desirable that windows be placed at least 10 to 12 feet above floor level. This permits fairly equal distribution of light across the area, prevents players from looking directly into the highly contrasting brightness-ratio of the outside, and allows a flat wall surface for such activities as one-wall handball and tennis practice. To permit equal light distribution to all parts of the area, windows should extend the entire length of the gymnasium or room.

Where it is not possible to provide sufficient window space on one or both sides of the gymnasium, due to the presence of permanent bleachers or other obstruction, additional natural lighting may be obtained by the use of clerestory windows, skydomes, glass blocks or by saw-tooth skylights.

The orientation of classrooms and activity areas is an important consideration in the problem of providing adequate and functional fenestration. Two distinctly different methods of using daylight as the major light source in building areas have been used in an attempt to attain a brightness-ratio of 50 to 1 between the brightest window area and the darkest large surface of the area.[1] The first and most frequently used method orients the large bank of windows to the north. The transom windows facing south are protected from direct sunlight by fixed louvers. When the room interior is finished with proper illumination in mind, and as long as the north sky remains close to its average brightness, this daylighting method will come close to insuring 50 to 1 brightness-ratios. This method is not highly recommended as being suitable in northern regions, however. The second method would take the same area and completely louver both banks of windows. This makes it possible to orient the building north, south, east, or west and still maintain a desirable lighting environment. In the past, an east-west orientation generally has been recommended.

Those areas of the physical education building which are subject to dampness, such as the locker-shower-drying room suite, equipment drying room, and swimming pool, should be oriented so as to receive direct sunlight.

It should be pointed out that many authorities are seriously questioning the provision of windows or skylights in the main gymnasium other than for psychological reasons. They have several very sound points to back up their beliefs: (1) It is virtually impossible to provide sufficient natural lighting of a gymnasium during the overcast fall and winter days prevailing in most sections of the country. Even where large windows are provided, artificial lighting must be used to permit visual efficiency in the performance of sports skills. (2) Windows almost always reduce ideal playing conditions for the activities in the area by causing sun glare, uneven distribution of light on the floor, shadows, and making it difficult at times to see objects clearly when performing a skill. (3) Large window areas are impossible in gymnasiums requiring permanent spectator seating, as bleachers must extend near ceiling height. (4) Modern systems of mechanical ventilation provide appropriate temperature and humidity in the gymnasium, thereby eliminating the need for obsolete, open-window ventilation. (5) It is difficult to provide adequate lighting by the use of skylights, clerestory windows or skydomes, and it is equally difficult to install skylights that do not leak, cause "rain" due to condensation of air near theceiling, or "sun spots" on the floor.

None of the methods of daylighting which have been proposed to date satisfies all of the requirements for an optimum luminous environment, and as none of the methods of daylighting provides an adequate quantity of light on dark overcast days (of which there are many during fall and winter months), it is suggested that a combination of the most advanced methods of providing natural and artificial lighting be included in all areas of the physical education building.

Artificial Lighting

Artificial illumination is necessary in all areas of the physical education building as a supplement to natural lighting, and is essential as the primary source in all areas used at night. The intensity of light in any given area can be regulated by adjusting the intensity of the source and by placing reflectors at the correct height and angle. The problem is primarily one of providing the desired intensities for the visual tasks and, at the same time, maintaining correct brightness-balance within the visual field.[1]

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[1] Charles Bursch and C. D. Gibson, op. cit., pp. 75-76.

Semi-direct lighting fixtures cause less glare and throw sufficient light on the ceiling to give it about the same brightness as the unit itself. Although a little more costly than direct light, it is recommended for classrooms, offices and activity areas where possible. Semi-direct lighting in the main gymnasium is extremely difficult in view of the typical open-roof-truss construction. Some activities of the building will require local as well as general light, but the major problem in activity areas is that of securing equal distribution of light, and correct intensities, over the entire area.

Despite the shift in emphasis from quantity to quality in the lighting of indoor areas, the number of foot-candles needed for good seeing is an essential part of the lighting problem. The recommendations below suggested by the General Electric Company in 1956 may be accepted as minimum for quantity of illumination.[2]

Location	Minimum maintained foot-candles
Classrooms, lecture rooms, libraries--on desks, tables, chalk, and tack-boards	50
Offices--on desks	50
Gymnasiums (For general exercise), swimming pools	30
Gymnasiums (For athletic contests) . .	100
Locker rooms, washrooms, corridors containing lockers, stairways	20
Storage rooms, open corridors	10

A 25 to 30 percent loss in illumination ordinarily may be expected in the months following the installation of lamps. This loss is due to deterioration of bulbs or tubes, the accumulation of dust and dirt on the light fixtures, and the inevitable soiling and discoloration of walls and ceilings. Because of this loss, the illumination at the time of installation of lamps should be approximately one fourth higher than the maintained level desired.

Considerable success has been achieved in the lighting of commercial office buildings, industrial plants, and laboratories by fluorescent lamps. At the present time, this appears to be the most desirable method of providing artificial light in school buildings.

As yet, relatively few colleges and universities have installed fluorescent lamps as the chief type of illumination in physical education buildings. The tendency has been to make a minimum initial investment by installing ring-type incandescent fixtures (low initial cost but high operating cost). The argument presented has been that the lights will burn only a few hours a day and, therefore, the high cost of the electricity used per hour does not matter. Actually, because of the inadequacy of natural lighting provisions, the lights burn all day. A better luminous environment at lower cost can be obtained by installation of fluorescent lamps.[1]

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[1] The College Physical Education Association, op. cit., pp. 67-8.

[2] Essential Data for General Lighting Design, Schenectady, New York, The General Electric Company, 1956, p. 2.

A study by Allen and Holmes,[2] in which they compared filament, combination mercury-filament, and fluorescent lighting in 102 high school gymnasiums, presents the following pertinent facts:

1. For the same light delivered, fluorescent lighting would cost less over-all than filament lighting in the majority of gymnasiums.

2. Mercury - vapor lighting, like fluorescent lighting, costs less over-all than filament lighting under many conditions. The objection to mercury lighting, when used alone, is its bluish color which distorts the appearance of complexions. When filament lighting is used with mercury in equal proportions, they make a very satisfactory combination for gymnasiums.

3. Under fluorescent lighting with two-lamp ballasts, there is no stroboscopic effect ("flicker") at 20 foot-candles and above.

4. Fluorescent lighting has the advantage of low brightness of source and reflector. This is particularly important when gymnasiums are used for "aerial" sports. These activities involve looking upward much of the time. For this reason it is highly desirable to minimize the direct glare produced by the lighting units. The low brightness inherent in fluorescent lamps is to be preferred from the standpoint of quality of lighting.

Where fluorescent lighting is installed in the main gymnasium, it is suggested that fixtures be recessed in the ceiling and a protective screen be provided to prevent,damage to light tubes or fixtures. By all means, thought should be given the method of servicing lights, it being recommended that cat walks be provided. A somewhat less desirable method is to provide drop cables for each light fixture, thereby permitting the individual fixture to be lowered for purposes of repair or exchange of tubes. It is amazing to note the number of modern million dollar gymnasiums constructed without thought being given to the problem of replacing burned-out light bulbs.

The program specialist should be concerned with the problem of artificial lighting in the physical education building primarily from the viewpoint of its relationship to the most desirable conduct of the program. Prior to the installation of lighting fixtures, the following points should be checked: (1) Light fixtures in all activity areas where balls are used should be protected by guards and located so as not to interfere with the normal playing of the activity. (2) Light fixtures in handball and squash courts should be recessed in the ceiling. (3) Light fixtures should be installed before the walls and ceilings have been finished. This is important if any changes must be made. (4) Local lighting may be required over practice goals, targets, boxing rings, and certain other areas in addition to the general lighting of the gymnasium or activity room. (5) Where the lights are to be installed at considerable height (i. e. , in the main gymnasium) attention should be given to the method of repair and replacement of lamps. (6) All lights should, insofar as possible, be shielded from players' eyes. (7) Lights in the locker-shower-drying unit, and in all other damp areas of the building, should be vapor-proof. (8) Naked lights should not constitute a safety hazard. (9) Overhead light fixtures in the dressing and locker room should be so placed as to cast their beams between locker rows rather than on tops of lockers. (10) Overhead lights should be recessed in the ceiling in storage rooms where heavy equipment will be moved in and out. (11) Light switches should be located near the exit of all activity areas, classrooms, and offices to promote more efficient control of lights and economy of operation. Where switches are inconveniently located, lights will oftentimes burn needlessly. (12) It should be possible to operate lights in the main gymnasium by a master switch, by means of switches controlling rows of lights, and by individual switches in a conveniently located control box. This will permit the illumination of any specific area of the gymnasium without necessitating the use of all lights. The control box should be located so as to be readily accessible to the operator but not where an irresponsible person might interfere with the lighting. A metal cover with lock should be provided on the control box. (13) Light switches should be located at a point from which the operator can see all fixtures in the area. (14) Emergency lights should be provided throughout the building.

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[1] D. E. Spencer, "Developments in Daylighting Schools Since World War 11," American School and University, 27th ed., New York, American School Publishing Corporation, 1955-56, pp. 402-03.

[2] C. J. Allen and R. E. Holmes, "Studies in Gymnasium Lighting," Reprinted from Illuminating Engineering, Vol. 44, No. 5, May, 1949.

Interior Finishes

Color schemes and ceiling, wall, and furniture finishes for classroom interiors should be selected to provide a pleasing, comfortable environment. Beyond that, however, color and the quality of finishes are important factors in the even distribution of light, and should be selected with this thought in mind. Bright, glossy finishes reflect light badly and are a source of glare. Flat or matte finishes provide the diffuse reflection necessary to an even distribution of light.

Essex[1] makes the following recommendations regarding interior finishes and the reflection-factor involved: (1) Ceilings should be flat white or tinted. (2) They should have a reflection-factor as high as possible (at least 80 percent for ordinary ceilings and 60 percent for acoustically treated ceilings). (3) Walls should have a 50 percent reflection-factor from the ceiling line to the baseboard or the floor. (4) Furniture and equipment should be light in color, matte finish, and with a reflection-factor of 30 percent.

Activity areas of the building should provide the same general brightness - balance and reflection-factor as classrooms. Consideration should be given to the cheerful environment of these areas as well as to the brightness difference between the background and a ball in flight.

Heating

Due to the wide variety of activity areas, andthe specific heating needs of each, the physical education building presents numerous problems to the heating expert. The function of the program specialist in regards to heating should be primarily that of explaining the specific heating needs of each area.

Since many areas of the building, such as the main gymnasium, recreation room, locker and shower rooms, and bowling alleys, will be in use at night, a zoned heating system is desirable. This makes possible the operation of heating and ventilation systems for each zone when and as required for weather and occupancy conditions. The heating expert should be thoroughly familiar with both day and night heating requirements of each area.

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[1] D. L. Essex, op. cit., pp. 126-27.

Experience has shown the following approximate temperatures to be desirable in specific rooms and activity areas of the physical education building: (1) 65 degrees Fahrenheit in gymnasiums and other activity areas; (2) 70 degrees F. in classrooms, offices and corridors; (3) 75 degrees F. in locker, shower, and drying rooms; and (4) 80 degrees F. in the natatorium. It should be possible to maintain these recommended temperatures despite weather and occupancy conditions through thermostatic control. The provision of individual thermostats in each of the areas mentioned will necessitate higher initial cost than with zone control but will provide the only really satisfactory method of heating in a building of such varying requirements.

The principle of safety suggests that all heating units be recessed in the walls and covered with a protective grille, or that they be located at a height sufficient to prevent accidental burns. Radiators or unit heaters should not be located so as to interfere with the comfort of spectators at athletic contests or exhibitions. Spectators, for example, should not have to sit with their backs against a heating unit or where hot air is blowing directly on them.

Ventilation

Ventilation may be achieved through the open-window or by mechanical means. As a general rule, mechanical ventilation is preferred to the open-window method since air changes are controlled more positively.

Mechanical ventilation is essential in virtually all areas of the building and especially in northern states. It is important that humidity and the rate of air change be such as to provide for the health and comfort of occupants, eliminate offensive odors, and to promote the efficient functioning of each area. Mechanical ventilation systems should reduce condensation of moisture and eliminate odors without causing appreciable drafts or excessive noise.

Air Conditioning

Although air conditioning of physical education buildings in northern climates is quite remote in view of the high cost of installation and rather limited seasonal utility, it is suggested that serious consideration be given to its provision at institutions located in the deep south and southwest.

The new physical education building at the University of Florida provides air conditioning in the main gymnasium, projection room, and recreation room, and a combination heating and mechanical ventilation system serves all offices and locker rooms of the building.

Custodial Facilities

The efficient functioning of the physical education program, the healthful aspects and sanitation of the environment, and the reduction of cleaning costs depend more than a little on intelligent planning of custodial and maintenance facilities.

It is highly desirable that slop sink closets for custodial supplies and equipment be located at strategic points throughout the building. It should not be necessary for custodians to store equipment in miscellaneous spaces such as cloak rooms, under stairways, or in vacant activity rooms. Nor should it be necessary for them to carry cleaning equipment from a storage room in some dark recess of the basement.

Each custodial closet should be equipped with a slop sink providing hot and cold water, a rack for hanging various cleaning equipment, and sufficient shelves of various sizes for the storage of supplies.

A central receiving and storage room for custodial and maintenance equipment should be located on the ground level, this being convenient to the custodial office. A receiving entrance with driveway and loading platform should be planned in connection with this area. If the building has more than two floor levels, it will be desirable to provide a freight elevator for the transportation of equipment and supplies from the storage room to other areas of the building.

In recent years, electric vacuum cleaners have replaced the traditional broom and sweeping brush as a means of removing dust and dirt in college buildings. Specially treated floor mops are an acceptable cleaning device but the ordinary type of broom has always been more effective for raising dust than removing it. The arguments against vacuum cleaning have little weight when the benefits of mechanical cleaning are properly considered. In addition to the improvement of healthful and sanitary conditions in the building, the installation of mechanical cleaning equipment should, in the long run, result in economy in maintenance costs. Davenport[1] reports, for example, that at Michigan State University a decrease of 40 percent in the cleaning budget of 1937, compared with that of 1929, resulted from the purchase and installation of vacuum-cleaning equipment.

Modern cleaners of the mechanical type provide special adaptations for a variety of needs. There is a complete range of appliances for cleaning floors, walls, ceilings, mouldings, radiators, upholstered furniture, chalk rails, and many other surfaces and materials.

It is important that the provision of such mechanical equipment be considered in the original building plans, as it otherwise will be very difficult and costly to include this after the building is completed.

It is suggested that large buildings be equipped with a central vacuum-cleaning system with permanent piping so that no part of the building is more than 50 feet from a hose outlet. In smaller buildings, portable vacuum cleaners may be acceptable, but these will require electrical outlets at strategic points.

Electrical Service Systems

Clocks. -- It is highly desirable that a clock be provided for every classroom and activity unit of the physical education building, and in main offices, the lobby, health service, locker and dressing rooms, and the training room. All clocks should be connected to an automatic program-clock system, and operated from a master clock located at a central point. All signals for changes in the daily program should operate automatically from this central source.

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[1] W. A. Davenport, "The Efficient Use of Vacuum-Cleaning Equipment," American School and University, 14th ed., New York, American School Publishing Corporation, 1942-43, pp. 166-67.

Special attention should be given to the location and protection of clocks in this building. They should be of sufficient size and so located as to be readily visible from all parts of the area. Since there is danger of breakage from thrown or batted balls, all clocks in activity areas preferably should be recessed flush with the wall, covered with a heavy wire-glass panel or other unbreakable material, and located at a relatively safe height.

Special attention should be given to the location of a clock or clocks in the main gymnasium. All too often, clocks are located where they are not visible when bleachers are occupied, or a single clock is provided which cannot be seen by all spectators. A large clock, placed at a sufficient height, and located at one end of the gymnasium may suffice, or it may be necessary to locate clocks at either end or side in very large gymnasiums.

Where clocks are provided in damp areas of the building, such as the natatorium and locker rooms, they should be moisture-proofed by a special installation.

Telephones. -- The number of telephones provided will depend upon staff size and the scope of functions served by the building. There should be at least two telephones provided for the director's office (one for his secretary and one for his private use), and a system of intercommunicating telephones connecting this office with other activities of the building. The provision of a private telephone for each staff member generally is not necessary, but phones should be installed convenient to all staff offices. A buzzer system, operated from the departmental secretary's desk, will enable staff members to be notified of phone calls. It is important that a phone be installed in the equipment supply room, the training room, the health service, the athletic director's office, and at points where several secretaries or clerical personnel work in one area.

To provide for the convenience of students and spectators, and to discourage the use of private telephones by unauthorized persons, it is recommended that one or more coin-operated phone booths be installed in the lobby of the building.

Audio-visual facilities. -- Special attention should be given to the installation of wiring and electric outlets for use of amplification system, motion picture projectors, radio broadcasting equipment, television equipment, record players, and other audio-visual equipment that is planned for use in the building. Prior to the drawing up of final wiring and installation plans, the program specialist should present to architects and engineers a list of the present and possible future audio-visual requirements of each area of the building.

Fire alarm system. -- A separate fire alarm and exit-light system will be essential. Since the installation and specifications are governed by state and local building codes and fire control regulations of the particular locality, this will be entirely a matter for building experts and state fire inspectors. By all means, the state and local building codes and the regulations of the locality governing fire protection should be carefully studied prior to the drawing up of specifications.

Electric scoreboard. -- The main gymnasium should be equipped with at least one large electric scoreboard and time clock for intercollegiate basketball contests. The size and location of the scoreboard should be such as to be clearly visible from all seats in the area. In very spacious gymnasiums it may be necessary to provide a scoreboard on either end or either side wall. Ideally, the provision of a scoreboard on both end walls is recommended as this permits players to see the score and time remaining even when the game is in progress.

There should be permanent wiring, preferably in conduit, between the scoreboard and the official scorer's table. The plug connection should be located at this station, thereby eliminating the necessity of running wires along the sidelines or beneath the bleachers. Floor plugs, where provided, should have metal covers which are flush with the floor surface.

Sanitary Facilities

As a general rule, modern vitreous china fixtures are recommended for drinking fountains, urinals, water closets, and lavatories. All fixtures should combine ease and certainty of operation with durability of material. It is recommended that all fittings be of chromium-plated brass.

Drinking fountains. -- A sufficient number of drinking fountains should be located in, or convenient to, all activity areas of the building. They should also be provided in the lobby, corridors, and locker rooms. Fountains should not, however, be located near exits or corners of corridors where interference with traffic circulation may occur. Nor should drinking fountains be located in toilet rooms. In the main gymnasium it is desirable to provide two fountains, one at either end of the playing floor and, if possible, on a direct line from the floor to dressing rooms.

It is suggested that drinking fountains be recessed in the wall to prevent their being damaged and to eliminate a safety hazard to players. Since many players must expectorate while engaging in strenuous activities, it is advisable that a recessed and self-flushing cuspidor be provided in connection with all drinking fountains in activity areas.

Either the foot-pedal or hand operated type of fountain is satisfactory. It is desirable that fountains be of the type, however, which throw water to one side rather than straight up, and that anti-splash rims of sufficient height to prevent water being spilled on the floor be provided.

The water from drinking fountains in physical education buildings has oftentimes been luke-warm in quality. A system whereby water to fountains is passed over an effective cooling unit would be greatly appreciated by all who use the facilities.

Urinals. -- For reasons of health and sanitation, all urinals should be equipped with an automatic flushing device. The back of the stall should incline toward the bottom and should receive the flushing spray evenly distributed across the top. The stall type of urinal which extends to the floor is preferred by many to the smaller wall-hung type. Where the full-length urinal is provided, the floor around the base should be pitched to drain into the urinal. If wall hung urinals are selected, a separate floor drain should be installed.

Lavatories -- All lavatories should be equipped with noncorrosive and tamper-proof fittings. The single outlet faucet for both hot and cold water is recommended. Authorities might consider the advantages of spray heads on faucets.

All lavatories in the building should be securely anchored to the wall. This is important from a functional point of view, as students and others using the lavatories will frequently unconsciously, or consciously, lean or sit on the fixtures. Where fixtures are supported only by their connections or by a weak method of wall attachment, they will eventually be damaged .

It is desirable that liquid soap be provided at each lavatory by means of a hand-operated dispenser. Securely attached paper towel dispensers should be located on the wall convenient to lavatories, and a metal container with swinging lid should be provided for disposal of towels.

Mirrors should not be located above lavatories as students may spend an undue period of time with personal grooming, thereby restricting the use of the lavatories.

Acoustics

Although the study of sound is now understood by those trained in this field and can be computed for all types of indoor areas, the fact remains that less attention has been given to acoustical correction in educational buildings than elsewhere.[1] A contributing factor, no doubt, has been a tendency among school authorities to "cut economic corners" in the construction of buildings. It has not been clearly understood that, even from a financial standpoint, acoustical correction is a good investment. By only a slight increase in building costs, conditions can be so improved that students and faculty do better work with less nervous and emotional strain.

Acoustical treatment should become standard practice for all types of rooms to be used for educational purposes. This applies especially to class and lecture rooms, gymnasiums and other activity rooms, and natatoriums. There is perhaps greater need for acoustical treatment of walls and ceilings in the physical education building than in most other structures on the campus.

There are at present three general types of acoustical corrective materials:[2] (1) ready-mixed plasters that are delivered in bags, mixed with water, and applied by plasterers; (2) acoustical boards and tiles which have some type of highly absorbent backing; and (3) acoustical stones, tiles, and other rigid units usually laid up in the manner of masonry construction, or cemented in place in simulate masonry.

The second type mentioned, perforated materials which are manufactured and marketed as a finished product ready for application to surfaces needing treatment, generally is regarded by architects as being the most effective and economical of all surface materials. They are of two types: (1) the perforated or porous boards or tiles, and (2) the perforated metals or other rigid materials backed with sound absorbents.

The primary task of the program specialist in planning acoustical treatment of the physical education building is to provide architects and acoustics specialists with all the necessary information they should know concerning the type of activities to be conducted in each area, the number who will participate at any given time, and the specific acoustic needs for efficient teaching and learning. The choice of best materials for use in achieving the desired results should be left to architects and specialists in the field.

Traffic Circulation

The physical education building should be so planned and constructed that traffic circulation avoids congestion, minimizes disturbances to activities, permits ease of supervision, reduces to a minimum travel distances, and provides for the safety and convenience of occupants. It is important that traffic lines of players and spectators should not conflict.

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[1] B. F. McMurry, "Acoustics in School and College Buildings," American School and University, 17th ed., New York, American School Publishing Corporation, 1945-46, p. 278.

[2] Ibid., pp. 278-80.

Where possible, facility units possessing functional relationship to outside areas should be conveniently accessible from outside entrances. Units using joint service facilities such as storage, toilets, and locker rooms should be grouped together.[1] Those areas which will be used at night when the rest of the building is isolated, such as the recreation room and bowling alleys, should be grouped together as a unit and separate entrances from the outside should be provided. The dressing-locker-shower-toilet units should be grouped and so located that direct communication is provided to as many activity areas as possible.

Doors. -- It is important that, where spectators will gather in certain areas of the building, a sufficient number of entrances and exits be provided which permit direct access to these areas from the outside without the necessity of traveling long distances through the building. Spectator entrances should be located with due regard to parking space, public lavatories and toilets, cloakrooms, ticket sales, and drinking fountains. Multiple doors should be provided for spectators to all activity areas of the building in which seating is provided and the number should meet fire exit and safety standards. By all means, spectator entrances to bleacher areas should be so located that it is not necessary for spectators to interfere in any way with the activity in progress. Ideally, traffic flow should be directly from the lobby or corridor to the bleachers.

The entrances for players in the main gymnasium and all other activity areas of the building should be so located and designed that interference with spectators or other activities will not occur. It is desirable that entrances be provided directly from locker rooms to activity areas. From the standpoint of building maintenance and sanitation, all entrances from athletic fields should be provided with some type of floor mat to prevent the tracking of dirt and mud into the building. It is particularly important that some type of device be provided for the removal of mud from shoe cleats outside the entrance to football dressing rooms.

Since the doors of this building must serve a wide variety of purposes and are subject to considerable abuse, their construction should depend upon both their location and their function. Interior doors leading to the main gymnasium and to other activity areas where it will be necessary to provide entrance for spectators or large pieces of equipment, should be constructed of light, yet durable, material which will not crack, splinter, or buckle. All exterior doors, and those in damp areas of the building, should be moisture-proofed.

It is important that all doors should be flush with the walls and should open outward. All exit doors should be equipped with panic bolts, door checks, foot stops, or permanent catches to hold doors open, push plates on inside, and pull handles on outside, and kick-plates on doors most frequently used. Glass panels in the upper portion of doors should be provided where additional artificial lighting is desirable, or where a view of the room or activity area interior is desired from the standpoint of supervision or safety. If provided, visual openings should be of heavy, non-shattering wire-glass, or equivalent.

It would be well for authorities to consider the advantages of providing doors other than the traditional type in certain areas of the building. Doors of the swinging hinge type have for years posed a serious safety hazard where provided in connection with activity areas. Sliding doors may be desirable as a means of connecting one activity area with another, and may also be used to advantage in certain storage rooms such as the apparatus storage room and the equipment storage room. Panels of the roll-up type may be used to advantage in certain small storage niches such as that provided for piano and record player.

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[1] The College Physical Education Association, op. cit., p. 70.

Corridors. -- The corridors of the physical education building should be of sufficient number and width to permit rapid circulation of traffic to and from the main gymnasium, activity areas, classrooms, and spectator seating space. A width of 12 feet for main corridors and 8 to 10 feet for secondary corridors is common practice. In view of the considerable wear and tear to which corridor floors are subjected, it is suggested they be of a hard, impervious material which will not scratch, chip, or show signs of deterioration. It is equally important that they present an attractive appearance, permit ease of cleaning, and insure non-skid footing. Terrazzo is highly recommended as meeting all standards for corridor floor surfaces.

Provision should be made for an attractive as well as functional environment in corridors. Pictures, friezes, and harmonious color combinations should provide a pleasant atmosphere for students, faculty, and visitors. Recessed display cases should be equipped with indirect lighting, and may have mirror backgrounds to reflect the reverse of trophies. Photographs of varsity and intramural teams may be placed in shallow recessed display frames and covered by a heavy glass panel.

The corridors should be free of all obstructions, and such equipment as drinking fountains, heating units, fire protection apparatus, and tackboards should be recessed. No corridor should lead to a dead end, as this might prove serious in case of panic.

Both natural and artificial lighting are desirable in corridors. All too often the corridors of physical education buildings are found to be dark, dreary passages, possessing no windows and but a few poorly spaced overhead lighting fixtures of insufficient intensity. Where possible, window openings should be provided on the side and ends of corridors. Fluorescent fixtures of the indirect type are recommended for artificial illumination.

An interesting, attractive, and extremely functional corridor plan is offered in the new physical education building at the University of Florida. The main entrance to the building is some 10 feet above the gymnasium floor level and opens into a spacious lobby which has ticket sales windows along both walls. A wide hallway to the right leads to the offices of the College of Physical Education and the Athletic Association general manager. A similar hallway to the left gives access to offices of the intercollegiate athletic staff. On the same level, and extending completely around the main gymnasium, a superbly attractive corridor provides access to spectator seating, six classrooms, the 200-seat visual education instruction theatre, the combatives room, the clubroom for students majoring in physical education, and two men's and two women's toilets. Access to seating space in the main gymnasium is provided by twelve inclined ramps leading from the corridor. The floor surface face is of ceramic mosaic tile, lower walls of cream-colored glazed tile, upper walls of light pastel green plaster, and ceilings of acoustical tile. An abundance of natural light is provided by louver type windows in the outer walls, and artificial lighting is by means of overhead fluorescent fixtures of the semi-direct type. A most unusual effect is achieved by the use of directional glass blocks in the inner walls, which serve the dual purpose of permitting natural light to the main gymnasium during the day and artificial light to the corridors at night.

Ramps. --Where ramps are provided in the building in place of steps, they should not be so steeply inclined as to cause a safety hazard when wet. A non-skid alundum content surface material is recommended. It may be advantageous to provide ramps where swimmers or players wearing cleated shoes must proceed from dressing rooms to natatorium and athletic fields located at an upper level.

Steps. -- All steps should be provided with safety treads, should have no more than an 8 inch rise, and should be clearly visible. It is important that handrails be provided on the sides and, also, in the middle if stairway is more than 8 feet wide.

CHAPTER VII

COMMON ERRORS IN PLANNING AND CONSTRUCTION

The evolution of satisfactory architecture has been largely the result of trial and error procedure over a period of years. Errors of omission and commission in the planning process are generally recognized only after facilities have been constructed and are in actual use. This fact is aptly stated by the department director who recently said, "It is regrettable that we could not have constructed a trial building-- and then erected the finished product after eliminating the errors of our first venture."

Through a realization of the common mistakes made at other institutions, authorities will be better able to plan a building which satisfactorily fulfills its purpose in the local educational program. School officials and architects who are planning new buildings should visit colleges and universities where facilities have been recently constructed, with the object of gaining helpful suggestions and, also, learning what mistakes have been made.

Although the positive approach to a problem is more to be desired than one which is based upon negativism, a list of common errors observed in existing physical education facilities throughout the country may serve as a helpful supplement to the suggestions of the preceding chapters.

Errors in the Over-all Planning of Facilities

Failure to:

Consider changing conditions which will affect the program and facilities. All too often the available information compiled by various offices on the campus pertaining to student enrollment, future campus development, and trends in program have not been utilized in the planning process.

Construct physical education buildings which are adequate to care for present and possible future student enrollment.

Construct a building with a sufficient variety of activity units to allow for the conduct of a professionally acceptable program.

Include program specialists on the planning committee.

Plan areas and facilities from the standpoint of accessibility to the groups to be served.

Design facilities with an appearance, arrangement, and atmosphere that invite their use by the student body.

Locate the building on a site which permits adequate outdoor activity areas and the future expansion of outdoor facilities.

Provide for the multiple use of facilities.

Failure to:

Eliminate such hazards as slippery or uneven playing surfaces, low ceilings, inadequate lighting, obstructions on playing surfaces, and unsuitable colors for walls and backgrounds.

Utilize available building funds wisely by providing unnecessary ornamentation, excessive spectator accommodations and considerable non-functional dead space in lobbies, corridors, and dressing rooms.

Build related units in such a fashion that only one administrative organization must be provided.

Group certain activity areas, such as handball and squash courts, in such a manner that supervisory efficiency is achieved.

Provide for the flexibility of activity areas. Separate rooms for a variety of activities is desirable but, all too often, large numbers of activity areas are provided which are used only for seasonal sports and lie idle during the major part of the year.

Provide sufficient and appropriate accommodations for spectators.

Provide adequate storage and maintenance space convenient to the areas to be served.

Locate stadium, field house, natatorium, or other separate structures convenient to the physical education building so that duplication of dressing, locker, and shower facilities are not necessary.

Arrange facilities within the building so that spectators need not travel through long corridors or walk over playing floors to reach seating accommodations.

Construct the building of materials, and in an architectural style, in keeping with the best traditions of the campus.

Provide surface materials which will stand up under use, are appropriate for the activities of the area, and do not present a safety hazard to participants.

Group administrative and staff offices, thereby reducing administrative efficiency.

Provide outside entrances to dressing and locker rooms, health service, recreation room, and all areas requiring truck delivery of supplies and equipment.

Provide facilities which are adequate to accommodate the average physical education class under actual game conditions.

Provide adequate toilets, lavatories, and drinking fountains for students, building personnel and spectators.

Provide separate facilities for both sexes.

Sound-proof all areas of the building in which noise is likely to prove a disturbing factor.

Provide the most satisfactory type of heating, lighting, and ventilation according to the specific requirements of each indoor area. The provision of individual thermostats in various facility units is oftentimes overlooked.

Group facilities in logical sequence according to normal traffic circulation within the building and within each facility unit.

Plan facilities in terms of the specific characteristics of the institution as regards geographic location, administrative policies, and educational purposes.

Utilize the area underneath permanent bleachers for activity areas, classrooms, offices or storage space.

Pool all available information which will lead to the construction of the most satisfactory facilities for the particular institution and program.

Errors in Specific Facility Units

A. Administrative Office Suite.

Failure to provide:

Administrative and staff offices in a building location which is convenient to students and visitors.

An office for the department director which is convenient to other staff offices.

A reception-waiting room adjacent to the office of the department director.

A separate work area for the secretarial and clerical staff.

Adequate storage space convenient to all offices and work areas in this unit.

Toilet and lavatory facilities convenient to offices.

B. Health Service Suite

Failure to provide:

The location of the health service where activities of the building will not prove a disturbing factor in the efficient functioning of this area.

Separate outside entrances to the health service. Entrances should be provided for students, the delivery of supplies and equipment, and emergency ambulance service.

Sound-proofed rooms of the unit in which health testing will be done.

The arrangement of rooms according to logical traffic circulation.

Separate offices for physicians and nurses.

Satisfactory dimensions for the examination room in terms of the space required for certain health testing.

Separate dressing rooms, toilets, and lavatories for both sexes and for both employees and students.

Adequate local and general artificial lighting in the examination room.

A technicians' laboratory, x-ray room, and dark room convenient to the examination room.

An emergency isolation room as a part of the unit, this being suitable for handling both sexes.

Adequate and conveniently located electrical outlets for all prescribed equipment in the unit.

An attractive and functional reception-waiting room.

Adequate storage space for supplies and equipment.

Custodial storage space.

C. The Main Gymnasium.

Failure to provide:

Appropriate and suitable floor and wall materials.

Satisfactory floor dimensions according to the official rules of the activities to be included in this area.

Sufficient "free space" between cross courts, side and end lines and the walls, the playing area, and spectator seating.

Ceilings of sufficient height for the efficient playing of basketball.

For the elimination of suspended apparatus, light fixtures, or other obstacles which will interfere with normal, efficient play.

A floor area of sufficient size to care for the needs of intramural and physical education class participation.

Floor plates for such equipment as volleyball standards, gymnastic apparatus, and rollaway bleacher locking devices.

Angle irons between floor and wall surfaces, and coved base and corners for walls.

Basketball backboards which can be raised when not in use, thus eliminating an obstruction to spectator vision or to other activities of the program. Individual key-operated, motor-driven winches are recommended.

Floor areas which serve multiple purposes in the instructional, intercollegiate, and recreational programs.

A sufficient amount of spectator seating space where this is demanded.

Seating arrangements with good sight lines to activity areas.

Bleachers of the type which do not reduce floor area for physical education and intramural activities.

Bleachers which do not interfere with players by extending too close to side or end lines of playing courts.

Bleachers which do not mark or mar the playing floor.

Heating units, radiators, or ventilation vents so placed as not to cause discomfort to spectators or safety hazards to players.

Movable bleachers of the type which present a smooth, flush wall surface when closed.

Sufficient, accessible, and well planned storage areas and spaces convenient to the areas to be served.

Acoustical treatment on walls and ceilings.

Motor-driven and soundproof movable partitions where additional teaching stations are desired in the gymnasium.

Sufficient and appropriate electrical outlets for radio and television broadcasting, amplifying system, record players, vacuum-cleaning, and all other equipment planned for use in the area.

Windows located at a sufficient height so as not to interfere with the activities of the area, cause glare in the eyes of participants, or be "blocked off" by folding or roll-away bleachers.

Skylights which do not leak, cause "sun spots" on the playing floor, or permit excessive condensation of moisture near the ceiling.

Protective screens for light fixtures, clocks, and windows.

Electric clocks and scoreboards which can be seen from all parts of the area.

Separate entrances to the area for players. These should lead directly from dressing rooms without the necessity of players having to mingle with spectators or cross spectator traffic lines.

Recessed drinking fountain and flush-type cuspidor for participants at both ends of the floor.

Thermostatically controlled heat and mechanical ventilation in the gymnasium.

Sufficient entrances and exits for spectators.

Spectator entrances which will eliminate the necessity of crossing over the playing floor to reach seating accommodations.

Adequate lighting over practice backboards and other areas requiring local illumination.

Large double doors for the passage of spectators and the movement of heavy apparatus and equipment.

Adequate ticket selling space, cloakroom, toilets and lavatories, booths for concessions, and drinking fountains convenient to spectator seating accommodations.

Separate facilities and equipment for the press, radio broadcasting, and television where demanded.

Adequate maintenance space adjacent to the floor area.

The installation of overhead gymnastic apparatus where exhibitions or intercollegiate competition will be held in this area.

A safe and convenient means of servicing overhead lights.

D. Locker-Shower-Toilet-Suite.

Failure to provide:

Dressing and shower facilities which are adequate to handle the numbers using these facilities during times of maximum use.

Separate units for physical education and recreation personnel, varsity athletic teams, visiting teams, faculty, and members of the opposite sex.

Ready access from this unit to gymnasium, natatorium, athletic fields, and special activity areas.

Good interrelationship of rooms within this unit. Failure to plan unit according to normal routing of students.

Vestibules for exits from the dressing room to athletic fields.

Mud scuffs and grilles outside all entrances from athletic fields.

Baffles between dressing-locker room and general traffic lanes.

Slip resistive ceramic tile or other suitable floor surfaces in dressing and locker rooms.

Glazed brick or other satisfactory surfaces in shower and drying areas.

Floor surfaces which do not present a safety hazard when wet.

Shower, toweling, and dressing-locker rooms with sufficient floor pitch and drainage.

Water resistant coved base under lockers.

Lockers arranged in such a way that light from windows shines between locker rows.

Locker rows arranged in such a way that supply room attendant can supervise the area.

Overhead light fixtures arranged in such a way that light shines between rows rather than on the tops of lockers.

Vapor-proof light fixtures in locker, shower, and drying areas.

Sufficient dressing space between locker rows.

Convenient access to the equipment supply and storage rooms from the dressing area.

Mechanical ventilation and thermostatically controlled heating units in dressing, locker, drying, and toilet rooms.

Recessed heating units or those placed at a sufficient height where they will not pose a safety hazard.

A tackboard for posting notices.

Shower room floors which drain to the sides rather than the center of the room.

Drains which can be removed for cleaning.

Sufficient drains to carry off the amount of surface water present during peak loads.

A stepped floor or low curb between shower room and drying area or locker room which will prevent water draining into these areas.

A sufficient number of shower heads to accommodate the number of students using facilities during peak load.

Shower heads which are not easily broken, can be removed for cleaning, and do not throw an excessive spray.

Shower heads at such a height as to prove functional for all users.

Valves of the individual type for both hot and cold water.

Recessed trays, if cake soap is to be provided, and securely attached gravity soap dispensers, if liquid soap is provided.

Sufficient non-corrosive wall hooks or bars for the hanging of towels in the toweling area.

Toilets and urinals separate from dressing, shower, and toweling rooms.

Toilet paper dispensers in each water closet.

Paper towel dispensers and waste receptacles in connection with lavatories.

A shelf or rack for books and other personal belongings in connection with the toilet area.

Urinals of the automatic or hand or foot pedal flushing type.

At least one drinking fountain in, or convenient to, each dressing and locker room.

Hose connections convenient to all areas of the unit.

Glazed or frosted glass in all windows of the dressing-locker-shower-unit through which a public view of the interior would be impossible.

Appropriate location of light switches.

A sufficient number of mirrors in dressing and locker rooms. Mirrors should not be directly above lavatories.

Storage space for custodial equipment and supplies.

E. Equipment Supply and Storage Rooms.

Failure to provide:

Equipment supply and storage rooms located convenient to locker and dressing areas.

An outside entrance for the delivery of equipment and supplies.

Shelves of sufficient number and depth to accommodate the storage of equipment and supplies.

Storage shelves and bins which are convenient to service windows and counters.

Partial fronts on shelves in which small articles such as socks and supporters are stored, therefore preventing the frequent spilling of these articles on the floor.

Racks for such equipment as golf clubs, badminton and tennis racquets and bats.

A service counter, or counters, of sufficient length and width to handle all equipment issued to students.

A method for closing and locking service counter openings.

The location of the service counter in an area of the dressing room which allows supervision of the room by equipment supply room attendants.

Burglar and fire protection through the provision of sturdy doors, windows, fireproof surface materials, and an automatic sprinkler system.

Traveling ladders for access to shelves near the ceiling.

Suitable bins or receptacles for soiled equipment.

Moth-proof closets for the hanging of uniforms and other woolen goods.

Suitable work space for the maintenance and repair of equipment.

A tackboard convenient to the service counter for the posting of notices pertaining to supply room and locker room procedure.

Sufficient work area in the center of the storage room.

An entrance of sufficient width to permit the moving of heavy equipment between the equipment supply and storage rooms.

Such equipment as telephones, filing cabinets, storage cabinets, deep sinks, desks, suspended scales, and work benches.

Mechanical ventilation and thermostatically controlled heat in connection with this unit.

F. The Athletic Training Room.

Failure to provide:

Location of the room adjacent to locker-dressing areas.

A training room of adequate dimensions to conveniently accommodate equipment and apparatus needed.

Suitable surfaces for the function of the area.

Suitable artificial and natural lighting.

Storage space (which can be locked) for supplies being used daily and for supplies being stored for future use.

Separate, isolated areas for diathermy and hydrotherapy equipment.

A service counter over which many of the small supplies such as ankle and knee wraps, bandaids, and protective pads can be issued, thereby reducing traffic flow in the room to a minimum.

A sink with hot and cold water convenient to the area where minor surgery may be performed by a physician.

Adequate and appropriate electrical outlets and plumbing connections for the equipment needed in the room.

Errors in Class Rooms and Special Activity Areas

A. Class rooms.

Failure to provide:

A sufficient number of classrooms for instructional purposes in connection with the physical education building.

For the location of classrooms where noise from activity areas will not prove a disturbing influence for students and instructors.

For the location of classrooms where sufficient natural lighting is possible.

Classrooms of sufficient size to accommodate the average number of students in classes.

Appropriate and comfortable seats.

Sufficient chalkboard and tackboard space.

Windows which are placed in such a manner as to prevent glare in the eyes of students or an uneven distribution of light throughout the room.

Overhead lights which do not cause glare and are of adequate intensity.

The most desirable materials and colors for walls and ceiling surfaces.

Mechanical ventilation and audio-visual venetian blinds in rooms where audio-visual equipment will be used.

Storage space for equipment to be used in the room.

Acoustical treatment.

B. Tumbling and Apparatus Gymnasium.

Failure to provide:

An area of sufficient size to promote efficient performance on all apparatus.

Floor plates for the attachment of apparatus and equipment.

An adjacent storage room for all apparatus and equipment used in the area.

A ceiling of sufficient height to permit attachment of suspended apparatus under official rules pertaining to the specific activities of gymnastics.

Wall apparatus boards for the attachment of apparatus to walls.

Overhead framework or beams for suspended apparatus.

Doors, without sills, of sufficient height and width to permit the passage of all equipment and apparatus used in connection with this area.

Spectator seating accommodations if this area is to be used for intercollegiate competition.

Doors which will not interfere with activities or prove a safety hazard to performers.

A recessed drinking fountain and flush-type cuspidor.

C. Corrective-Exercise Gymnasium.

Failure to provide:

The most cheerful, attractive area possible for handicapped students.

The location of this area convenient to dressing and locker rooms.

The location of this area on the ground floor, thereby not requiring handicapped students to climb flights of stairs.

Facilities which are planned according to a study of the average number and types of students enrolled who will use this area.

The essential facilities and equipment necessary in an appropriate and successful adapted and corrective physical education program.

Storage space for equipment and apparatus used in connection with the program.

D. Combatives Room.

Failure to provide:

For the location of this area adjacent to and on the same level as the main gymnasium if intercollegiate competition in boxing or wrestling is to be conducted in the main gymnasium. This is essential in view of the heavy apparatus and equipment which must be moved to and from the two areas.

Separate areas for boxing and wrestling of sufficient size to accommodate official rings and mats.

Doors of sufficient height and width to permit the passage of all apparatus and equipment used in connection with these activities.

Storage space adjacent to the areas to be served.

Mechanical ventilation and thermostatically controlled heat in this area.

Adequate natural and artificial lighting. Windows located above wall-hung mats. Failure to provide local lighting over boxing rings and wrestling mats.

A separate sound-proof room for punching bags.

Drinking fountains and self-flushing cuspidors convenient to boxing rings and wrestling mats.

The arrangement of facilities in such a manner that students do not walk over mats or interrupt classes when passing to or from specific areas in this unit.

Wall-hung protective mats around the boxing and wrestling area.

E. Handball Courts.

Failure to provide:

A sufficient number of courts to accommodate the average number of students in physical education classes under actual game conditions.

Courts which are of adequate size to permit efficient performance.

Courts which are arranged in such a manner that effective supervision is possible.

Courts which are located in a dry, clean, and pleasant environment.

Wall surfaces which will not crack, crumble, or warp.

Floor surfaces which are not slippery and will not buckle.

Sufficient natural lighting throughout the area.

Doors which do not open into the playing court.

Light switches which are located convenient to courts but not on inside walls.

Light fixtures which do not throw considerable glare in the eyes of players. The light fixtures should be focused to throw their beams principally on the walls.

Mechanical ventilation and thermostatically controlled heat in these areas.

The entrance to handball courts at the rear of the area.

Doors which close flush with walls and provide the same rebound as the walls around the opening.

Drinking fountains and self-flushing cuspidors convenient to all handball courts.

Light colored wall and ceiling surfaces and surfaces which do not cause glare from the lights.

Removable telltale boards in courts which will be used for squash racquets.

Wall and ceiling surfaces which are free of such obstructions as suspended lights, windows, beams, and door knobs.

F. Dance Studio.

Failure to provide:

A dance studio of sufficient size to accommodate a normal class in the various types of dancing.

A convenient location to locker-dressing areas of both sexes, and to the main entrance of the building if the dance studio is to be used for small campus social affairs.

Appropriate surfaces, having both functional and attractive characteristics.

Plentiful natural and artificial lighting.

Adequate and adjacent storage space for piano, record player, instrument rack, record cabinet and other equipment to be used in the room.

Large, recessed mirrors along at least one side of the room.

An adjacent kitchenette and serving counter if the area will be used for campus social affairs.

Attractive drapes, surface colors, and room fixtures, to promote the proper environment for the activities which will be included in the room.